

ALBERTO VENCHI* & ROBERTO SINDACO**

ANNOTATED CHECKLIST OF THE REPTILES OF THE MEDITERRANEAN COUNTRIES, WITH KEYS TO SPECIES IDENTIFICATION. PART 2 - SNAKES

(REPTILIA, SERPENTES)

INTRODUCTION

The Mediterranean area, as considered in this article, is probably one of the most studied by the zoologists.

Presently, a lot of material has been published dealing with the snake fauna in the Mediterranean area. The most useful works for identification of the species are those by ARNOLD & BURTON (1978), ARNOLD (2002) and BÖHME (1993, 1996, 1999) for Europe, SCHLEICH *et al.* (1996) for North Africa, and GRUBER (1989) for the entire area. Also useful because dealing with nearby area are GASPERETTI (1988) for Arabia, LEVITON *et al.* (1992) for the Middle East and ŠČERBAK (2003) for former USSR.

As far as the distribution is concerned, the main references are GASC *et al.* (1997) for Europe, BONS & GENIEZ (1996) for Morocco, DISI *et al.* (2001) for Jordan and SINDACO *et al.* (2000) for Anatolia.

The distributions reported in this article are based on a database made by the authors, including more than 14.000 records, taken from 500 articles, critically revised, and from some museum collections.

In recent years the herpetofauna of the Mediterranean has been subjected to several revisions, mainly on the basis of molecular methods, so that a lot of taxonomic changes have occurred. It seems therefore useful to provide a comprehensive annotated checklist of the snakes of the Mediterranean basin and keys for their identifica-

* Via Donna Olimpia 204, 00152 Roma

** Museo Civico di Storia Naturale, Cascina Vigna, 10022 Carmagnola (TO)

tion, having in mind especially to help museum curators who are not specialised in the Mediterranean herpetofauna.

This article concludes the checklist and keys for identification of the Mediterranean herpetofauna started with the paper by SINDACO (1998).

GEOGRAPHIC BOUNDARIES

The area of the checklist includes: Europe (limited eastwards to the Urals, the Volga river, the Caspian Sea and the Great Caucasus), Transcaucasia (Georgia, Armenia, Azerbaijan), Near East and Levant (Turkey, Syria, Lebanon, Jordan, Israel), and North Africa (Egypt, Libya, Tunisia, Algeria, Morocco, Western Sahara); all the Mediterranean islands are included.

No native snake species occurs in the Atlantic archipelagos of Canary, Selvagens, Azores and Madeira.

MATERIALS AND METHODS

1 - CHECKLIST

Families are listed in the following order: Leptotyphlopidae, Typhlopidae, Boidae, Colubridae, Atractaspididae, Elapidae and Viperidae (including the Crotalinae). In each family, genera and species are listed in alphabetical order.

Trinomial nomenclature is used for the polytypic species; all subspecies are reported, specifying if they occur in the study area.

Considering the aim of this work, we prefer to treat groups of species when the taxonomy is not yet sufficiently stable; the opinions of the different specialists are reported.

Nowadays, the systematic studies have different approaches (i.e. morphological, biochemical, molecular). When the results of such studies do not concur or seem still unresolved or are based on a limited number of morphological characters (or colour patterns), we preferred to include these taxa within species complexes.

Original name, type locality, range, extralimital distribution, distribution pattern and additional remarks are provided for each species.

The “Range” describes the distribution within the study area by listing the countries where the species occurs and, when necessary, more specific geographic locations. Geographic distribution is usually reported from West to East and from North to South.

The “Extralimital distribution” is included in case a species occurs also outside the study area.

The “Distribution pattern” refers to the chorotypes proposed by VIGNA TAGLIANTI *et al.* (1992, 2000) for the Palaearctic fauna, and to LA GRECA (1990) and CARPANETO & PIATTELLA (1990) for the Afrotropical taxa.

2 - KEYS

The identification keys are based especially on external morphological characters considered by the scientific literature; such keys are either original ones or inspired by those presented in taxonomical revisions (often with deletion or addition of some species) and modified.

Anyway these keys were tested on museum specimens by the authors and, for the species not available, on descriptions and illustrations.

Among the main bibliographic sources there must be mentioned ARNOLD & BURTON (1978), BAŞOĞLU & BARAN (1980), BONIS & GIROT (1962), GASPERETTI (1988) and ŠČERBAK (2003); besides, very important past references such as BOULENGER (1893, 1894, 1896), DOUMERGUE (1901) and ANDERSON (1898) have been also utilised.

3 - MUSEUM COLLECTIONS

The following museums collections were studied:

- Museo Civico di Storia Naturale “Giacomo Doria”, Genova
- Museo Regionale di Scienze Naturali (which includes also the material of the former Museo di Zoologia dell’Università di Torino), Torino
- Museo Civico di Storia Naturale, Carmagnola (Torino)
- Museo di Zoologia “La Specola” dell’Università di Firenze
- Museo di Zoologia dell’Università di Roma “La Sapienza”.



Figure 1 - Study area (light area).

Suborder OPHIDIA

Family LEPTOTYPHLOPIDAE

Genus *Leptotyphlops* Fitzinger, 1843

Leptotyphlops algeriensis (Jacquet, 1895)

Glauconia algeriensis Jacquet, 1895

Type locality. “environs du Hammam Salahin, bain situé à six kilomètres au nord de Biskra” (near Biskra, Algeria).

Range. S Tunisia, Algeria, Morocco, Western Sahara.

Extralimital distribution. Mauritania, N Mali, NE Niger.

Distribution pattern. Palearctic (W Saharan).

Leptotyphlops cairi (Duméril & Bibron, 1844)

Stenostoma Cairi Duméril & Bibron, 1844

Type locality. “Environs du Caire” (Cairo env., Egypt).

Range. Egypt (Nile valley).

Extralimital distribution. Mauritania, Niger, Sudan, Ethiopia, Somalia.

Distribution pattern. Afrotropical (Sahelo-Sudano-Somalian *sensu* LA GRECA 1990).

Subspecies. Monotypic.

R e m a r k s . McDIARMID *et al.* (1999) include Libya in the range of the species and refer to the maps of LE BERRE (1989) for the Saharan distribution of the species, but no literature or museum record has been found in order to confirm this presence.

According to TRAPE (2002), *L. macrorhynchus bilmaensis* Angel, 1936 is a synonym of this species.

Leptotyphlops macrorhynchus (Jan, 1860)

Stenostoma (Rhamphostoma) macrorhynchum Jan in Jan & Sordelli, 1860

Type locality. “Sennaar” (Sudan).

Range. On the basis of recent works (HAHN & WALLACH 1998; TRAPE 2002), the assessment of the real distribution of this species is uncertain, since most of the specimens from northwestern Africa have been assigned to other taxa. The species has been recorded from Libya, Egypt, Sinai, Israel, Jordan, SE Anatolia. In accordance with TRAPE (2002), the records from S Morocco, Algeria and Tunisia are now assigned to *L. algeriensis*.

Extralimital distribution. Poorly known due to confusion with other similar species; quoted from Senegal [where it seems not present, see TRAPE (2002)], S to Ghana and N Kenya, eastwards to Ethiopia, Eritrea, NE Somalia, Arabian Peninsula, Iraq, S Iran, Pakistan, NW India (Sind) (HAHN 1978, 1980).

Distribution pattern. Palearctic and Afrotropical (Saharo-Sindian).

Subspecies. Monotypic.

R e m a r k s . The holotype was preserved in Milan but it has been lost during the II World War.

According to TRAPE (2002), the status of *L. macrorhynchus* in Africa is uncertain, as almost all specimens that should belong to this species have been assigned to other taxa, whereas the original description and the drawing of the type specimen fall within the variability of *Leptotyphlops cairi*.

As a consequence, the Middle East populations need further studies to confirm their status.

Family TYPHLOPIDAE

Genus *Ramphotyphlops* Fitzinger, 1843

Ramphotyphlops braminus (Daudin, 1803)

Eryx braminus Daudin, 1803

Type locality. Vizagapatam (India).

Range. Egypt (Cairo area).

Extralimital distribution. Widespread in sub-Saharan Africa, Arabian peninsula, Indian sub-continent and South-East Asia; introduced in N Australia, Indian Ocean's and Pacific islands, E U.S.A., Mexico and Guatemala. Widely introduced by man, the exact origin is not known.

Distribution pattern. Afrotropical and Oriental.

Subspecies. Monotypic.

R e m a r k s . The presence in Egypt is very likely due to introduction.

Genus *Rhinotyphlops* Fitzinger, 1843

Rhinotyphlops simoni (Boettger, 1879)

Onychocephalus simoni Boettger, 1879

Type locality. "Haiffa Syriae" (Haifa, Israel).

Range. Syria (Golan Plateau), Israel, W Jordan.

Distribution pattern. Palaearctic (Mediterranean, Levantine endemic).

Subspecies. Monotypic.

Rhinotyphlops episcopus Franzen & Wallach, 2002

Type locality. 3 km north of Halfeti on road to Savasan Köyü, upper slopes of Euphrates River Valley, Urfa Province, SE Turkey.

Range. SE Turkey (Şanlıurfa province).

Distribution pattern. Palaearctic (Mediterranean, SE Anatolian endemic).

Subspecies. Monotypic.

R e m a r k s . The sister-taxon of *Rhinotyphlops simoni*.

Genus ***Typhlops*** Oppel, 1811

Typhlops vermicularis Merrem, 1820

Type locality. "Archipelago, Asia" restricted to "Griechische Inseln" (= Greek islands) by MERTENS & MÜLLER (1928).

Range. S Balkans, Aegean Is., Anatolia, Cyprus, Syria, Lebanon, Israel, Jordan, Transcaucasia, Daghestan. Quoted also for Sinai (WERNER 1982).

Extralimital distribution. S Turkmenia, S Uzbekistan, W and S Tajikistan, Iran and NW Afghanistan.

Distribution pattern. Palaearctic (Turano-Mediterranean).

Subspecies. Monotypic.

Family BOIDAE

Genus ***Eryx*** Daudin, 1803

Eryx jaculus (Linnaeus, 1758)

Anguis Jaculus Linnaeus, 1758

Type locality. "Aegypto" (= Egypt).

Range. E Aegean Is., Anatolia, Syria, Lebanon, Israel, Jordan, Transcaucasia, E Ciscaucasia; extreme NE Morocco, N Algeria, Tunisia, N Libya, N Egypt.

Extralimital distribution. NE Saudi Arabia, Iraq, Iran.

Distribution pattern. Palearctic (E Mediterranean, N Arabian and Iranian).

Subspecies. According to TOKAR (1990, 1991; see ŠČERBAK 2003), the nominate form occurs in North Africa eastward to the Suez Canal, while *E. j. turcicus* (Olivier, 1801) occupies the remaining range. The subspecies *turcicus* and *familiaris* Eichwald, 1831 are considered synonyms.

Eryx miliaris (Pallas, 1773)

Anguis miliaris Pallas, 1773

Type locality. "Near the Caspian Sea" according to STIMSON (1969: 19).

Range. E Ciscaucasia.

Extralimital distribution. Turan Depression E to S Mongolia and China (Sinkiang, Gansu, W Nei Mongol, Ningxia); Iran, Afghanistan, Pakistan.

Distribution pattern. Palearctic (Turanian and Eastern Turkestan).

Subspecies. The nominate from northeastern Caucasus eastward to Aral Sea and Syr-Darja river; *tataricus* (Lichtenstein, 1823) from Turgay and Syr-Darja rivers eastwards; *speciosus* Carevskij, 1916 from southern Tajikistan, Afghanistan and Pakistan.

R e m a r k s . According to TOKAR (1990, in McDIARMID *et al.* 1999), *E. miliaris* is part of a complex, together with *E. tataricus*, probably a junior synonym, and with *E. speciosus*, which should deserve specific rank.

Genus ***Gongylophis*** Wagler, 1830

Gongylophis colubrinus (Linnaeus, 1758)

Anguis colubrina Linnaeus, 1758

Type locality. "Aegypto" (= Egypt).

Range. Egypt.

Extralimital distribution. Niger (Aïr), Chad, Sudan, Ethiopia, Eritrea, Somalia, Kenya, N Tanzania (TOKAR 1996).

Distribution pattern. Afrotropical (Sahelo-sudano-somalian *sensu* LA GRECA 1990).

Subspecies. Monotypic species with geographic variability (TOKAR 1989).

Family COLUBRIDAE

The genera *Coluber* Linnaeus, 1758 and *Elaphe* Fitzinger, 1833 have been recently subjected to taxonomic revisions, which provided some clarifications on the relationships also with other colubrid taxa, namely *Coronella* Fitzinger, 1843 and *Eirenis* Jan, 1862.

As for the whip snakes previously assigned to the genus *Coluber*, SCHÄTTI (1987) states that the genus *Coluber* is valid only for two Nearctic species.

SCHÄTTI & UTIGER (2001), NAGY *et al.* (2004) and SCHÄTTI & MONSCH (2004) propose a tentative phylogeny of the former genus *Coluber*.

SCHÄTTI & UTIGER (2001) and SCHÄTTI *et al.* (2001) recognize the genera *Hemorrhois*, *Hierophis* and *Platyceps* for the species of the study area previously assigned to *Coluber*. However, it emerges also that *Hierophis* (*sensu* SCHÄTTI 1988a) is paraphyletic because it includes *Eirenis*. In order to avoid this, the genus *Hierophis* should include only *viridiflavus*, *gemonensis* and *cypriensis* (SCHÄTTI & UTIGER 2001; SCHÄTTI & MONSCH 2004; UTIGER & SCHÄTTI 2004). NAGY *et al.* (2004) propose *Dolichophis* Gistel, 1868 for the eastern Mediterranean taxa *caspius*, *jugularis* and *schmidtii*, but we here prefer to retain a provisional nomenclature. As a consequence, "*Hierophis*" *caspius*, *schmidtii* and *jugularis* are provisionally assigned to *Coluber sensu lato* as well as *C. sinai*, whose taxonomic status is still uncertain (SCHÄTTI *et al.* 2001).

As for the rat snakes usually included in the genus *Elaphe*, LENK *et al.* (2001) and UTIGER *et al.* (2002) showed that this genus is made

of several phyletic lineages. HELFENBERGER (2001) revived *Rhinechis* Michahelles, 1833, while UTIGER *et al.* (2002) split the western palaeartic species in three genera, reviving *Zamenis* Wagler for four species.

Genus *Coluber* Linnaeus, 1758 *sensu lato*

Coluber (s.l.) *caspius* (Gmelin, 1789)

Type locality. "Steppes of Jaiki, lower basin of the Urals" restricted by MERTENS & MÜLLER (1928).

Range. Balkans north to Hungary, Ionian and Aegean Is., through S Ucraina to S Russia, N of Caucasus and E of the Volga River, W Anatolia, N Azerbaijan.

Extralimital distribution. Extreme W Kazakhstan.

Distribution pattern. Palaearctic (Turano-Mediterranean).

Subspecies. ZINNER (1972) describes the subspecies *eiselti* for the Rhodes' population, previously assigned to *C. jugularis*.

Coluber (s.l.) *jugularis* Linnaeus, 1758

Type locality. "Aegypto" (= Egypt).

Range. S Anatolia, Cyprus, Syria, Lebanon, W Jordan, Israel, Sinai.

Extralimital distribution. Iraq, SW Iran (SCHÄTTI 1988a). Recently recorded also in Kuwait (AL-MOHANNA *et al.* 1997).

Distribution pattern. Palaearctic (SW Asiatic).

Subspecies. The nominate and *asianus* (Boettger, 1880), whose validity needs confirmation.

Remarks. The subspecies *erythrogaster* Fisher, 1832 is recorded from Transcaucasia, while the ssp. *cypriacus* Zinner, 1972 is described from Cyprus.

Coluber (s.l.) *schmidtii* Nikolsky, 1909

Type locality. Bolgar-Chay River, Mugan steppe, S Azerbaijan (Eschaktchi in Lenkoran region and Tbilisi).

Range. C and E Anatolia, E Transcaucasia, SE Daghestan, Syria, N Jordan.

Extralimital distribution. W and N Iran and adjacent areas of Turkmenistan and Uzbekistan.

Distribution pattern. Palaearctic (Irano-Anatolian).

Subspecies. Monotypic.

Coluber (s.l.) sinai (Schmidt & Marx, 1956)

Lytorhynchus sinai Schmidt & Marx, 1956

Type locality. Wadi Feizan, Sinai.

Range. Sinai, S Israel, SW Jordan.

Distribution pattern. Palaearctic (Sinai and NW Arabian endemic).

Subspecies. Monotypic.

R e m a r k s . SCHÄTTI *et al.* (2001) suppose this taxon as closely related to *Platyceps*.

Genus ***Coronella*** Laurenti, 1768

Coronella austriaca Laurenti, 1768

Type locality. Vienna, Austria.

Range. Most of Europe (except of the northernmost regions), east to 65° longitude, N and C Anatolia, Transcaucasia.

Extralimital distribution. N Iran.

Distribution pattern. Palaearctic (European with Caucasian and Anatolian extension).

Subspecies. Monotypic.

R e m a r k s . HELFENBERGER (2001) states that *Coronella* is an unnatural group, on the basis of genetic distances, but UTIGER *et al.* (2002) do not confirm this point of view.

Coronella girondica (Daudin, 1803)

Coluber girondicus Daudin, 1803

Type locality. Bordeaux, France.

Range. Iberian Peninsula, S France, Italy (except of Calabria and Sicily), Morocco, Algeria, Tunisia.

Distribution pattern. Palaearctic (W Mediterranean).

Subspecies. Monotypic.

R e m a r k s . See above.

Genus ***Dasyzeltis*** Wagler, 1830

Dasyzeltis scabra (Linnaeus, 1758)

Coluber scaber Linnaeus, 1758

Type locality. “Indiis”, *fide* Linnaeus (1758; in error) [= Cape Colony, South Africa].

Range. SW Morocco, N Western Sahara and Egypt.

Extralimital distribution. Widely distributed in Sub-Saharan Africa and SW Arabian Peninsula.

Distribution pattern. Afrotropical (Subsaharan-SW Arabian).

Subspecies. Monotypic.

R e m a r k s . An ancient record from Fayum (N Egypt; ANDERSON 1898), has been reconfirmed by REHÁK & OSBORN (1988).

Genus ***Eirenis*** Jan, 1862

The genus *Eirenis* seems closely related to the whip snakes and, according to different authors, is the sister taxon either of the genus *Hierophis* s.s. (NAGY *et al.* 2003) or of the clade composed by “*Coluber*” *caspius*, “*C.*” *jugularis* and “*C.*” *schmidtii* (SCHÄTTI & UTIGER 2001).

NAGY *et al.* (2003) propose a phylogeny based on molecular data, allocating the species to four subgenera: *Eirenis* Jan, 1863 (including

modestus and *aurolineatus*), the new subgenus *Eoseirenis* (for *decemlineatus*), *Pseudocyclophis* Boettger, 1888 (for *persicus*) and *Pediophis* Fitzinger, 1843 (for all remaining taxa).

Eirenis collaris (Ménétries, 1832)

Coluber collaris Ménétries, 1832

Type locality. Bechebermak, near Caspian Sea.

Range. E Anatolia, E Transcaucasia, Daghestan.

Extralimital distribution. W Iran, NE Iraq.

Distribution pattern. Palaearctic (Irano-Caucasian).

Subspecies. The nominate (most of the range) and the ssp. *macrospilotus* Werner, 1903 (SE Turkey, Kars province).

R e m a r k s . *Contia collaris*, quoted by HAAS (1951: 88-89) in Jordan, is very likely *E. rothi*.

Eirenis coronella (Schlegel, 1837)

Calamaria coronella Schlegel, 1837

Type locality. Syria, restricted by SCHMIDT (1939).

Range. Syria, S and C Jordan, S Israel, S Sinai.

Extralimital distribution. Iraq, SW Iran, NE Saudi Arabia; an isolated sub-range in W Saudi Arabia.

Distribution pattern. Palaearctic (SW Asiatic).

Subspecies. The nominate (Israel, Jordan, Syria and W Iraq), *ibrahimi* Sivan & Werner, 2003, endemic to the southern Sinai, *fennelli* Arnold, 1982 (W Saudi Arabia) and *coronelloides* (Jan, 1862) from Jordan, Syria, SE Turkey and NE Iraq.

Populations from SW Iran, S Iraq and NE Saudi Arabia cannot be assigned with certainty to any subspecies, although so far considered as belonging to *E. c. coronella*.

R e m a r k s . SIVAN & WERNER (2003) raise *Eirenis coronelloides* at the species level, but this point of view needs confirmation.

Eirenis decemlineatus (Duméril & Bibron, 1854)

Ablabes decemlineatus Duméril & Bibron, 1854

Type locality. Not indicated.

Range. SE Anatolia, Syria, Lebanon, Israel, Jordan.

Extralimital distribution. Quoted generically from Iraq by KHALAF (1959).

Distribution pattern. Palearctic (E-Mediterranean).

Subspecies. Monotypic.

Eirenis eiselti Schmidtler & Schmidtler, 1978

Type locality. 25 km W of Viranşehir (Prov. Urfa, Turkey).

Range. SE Anatolia.

Distribution pattern. Palearctic (SW Asiatic, Kurdish endemic).

Subspecies. Monotypic.

Eirenis lineomaculatus Schmidt, 1939

Type locality. Jordan valley, Palestine.

Range. E Mediterranean Anatolia, Syria, Lebanon, Israel, Jordan.

Distribution pattern. Palearctic (E Mediterranean).

Subspecies. Monotypic.

The *Eirenis modestus* complex

SCHMIDTLER (1993) revised the systematics of the *Eirenis modestus* complex in the S Anatolia and described new species and subspecies. Such revision has been made on the basis of morphological characters (mainly the head and neck patterns). The taxonomic status of these very similar forms should be supported by biochem-

ical and genetic studies. Provisionally we adopt the nomenclature proposed by SCHMIDTLER (1993, 1997) that recognizes the following species: *E. aurolineatus*, *E. barani*, *E. levantinus* and *E. modestus*.

Eirenis aurolineatus (Venzmer, 1919)

Contia collaris var. *aurolineata* Venzmer, 1919

Type locality. Bolkar Dağı, Km 75 along the Taurus Rd. Bozanti-Tarsus (S Turkey).

Range. S Anatolia (S slope of Bolkar Mts.).

Distribution pattern. Palearctic (E Mediterranean, Taurian endemic).

Subspecies. Monotypic.

Eirenis barani Schmidtler, 1988

Type locality. Akdam, 35 km W of Kozan, Adana prov., S Turkey.

Range. SE Mediterranean Anatolia (Adana province) and NW Syria.

Distribution pattern. Palearctic (E Mediterranean, Taurian endemic).

Subspecies. The nominate subspecies and the ssp. *bischofforum* Schmidtler, 1997 (Tahtali Mts.).

Eirenis levantinus Schmidtler, 1993

Type locality. 6 Km SW of Karaisali, Adana prov., S Turkey.

Range. S Anatolia, NW and SW Syria (Mt. Hermon), Lebanon.

Distribution pattern. Palearctic (E Mediterranean, Levantine endemic).

Subspecies. Monotypic.

Eirenis modestus (Martin, 1838)

Coronella modesta Martin, 1838

Type locality. Trabzon, Turkey.

Range. Thrace, some E Aegean islands, the whole Anatolia except of the extreme SE, Transcaucasia, Daghestan.

Extralimital distribution. Quoted by LATIFI (1991) from the Central and Zanjhan provinces in Iran. The records previously referred to *E. modestus* from the coastal SE Turkey to Israel, must be referred to *E. levantinus* or perhaps to an undescribed species (SCHMIDTLER & BARAN 1993; SCHMIDTLER 1997).

Distribution pattern. Palaearctic (SW-Asiatic, Anatolo-Caucasian).

Subspecies. The nominate and the subspecies *cilicius* Schmidtler, 1993, *semimaculatus* (Boettger, 1876) and *wernerii* Wettstein, 1952.

Eirenis persicus (Anderson 1872)

Cyclophis persicus Anderson, 1872

Type locality. Bushire, Iran.

Range. SE Anatolia, S Armenia.

Extralimital distribution. SW Turkmenistan, Iran, N Iraq, Afghanistan, Pakistan, NW India (LEVITON *et al.* 1992).

Distribution pattern. Palaearctic (Sindian-SW Asiatic).

Subspecies. The nominate subspecies, including *walteri* (Boettger, 1888), and *nigrofasciata* (Nikolsky, 1907), which occurs in SW Iran and neighbouring Iraq (DOCZENKO 1989).

Remarks. The species was so far assigned to *Pseudocyclophis* Boettger, 1888, following DOCZENKO (1985).

Eirenis punctatolineatus (Boettger, 1892)

Cyclophis modestus var. *punctatolineata* Boettger, 1892

Type locality. Armenia.

Range. E Anatolia.

Extralimital distribution. Armenia, Nakichevan (Azerbaijan), W Iran.

Distribution pattern. Palaearctic (SW Asiatic, Armenian endemic).

Subspecies. The nominate subspecies is distributed in the eastern Anatolia; the doubtful ssp. *kumerloevei* Eiselt, 1970 was described from the Akdamar islet in the Van Lake.

Eirenis rothi Jan, 1863

Type locality. Jerusalem, Israel.

Range. SE Anatolia, Lebanon, Syria, Jordan, Israel.

Distribution pattern. Palaearctic (E-Mediterranean).

Subspecies. Monotypic.

R e m a r k s . The presence in Lebanon needs confirmation (HRAOUI-BLOQUET *et al.* 2002).

Eirenis thospitis Schmidtler & Lanza, 1990

Type locality. 2-3 km NNE of Van, about 2000 m a.s.l. (E Turkey).

Range. SE Anatolia. Endemic.

Distribution pattern. Palaearctic (SW Asiatic, Kurdish endemic).

Subspecies. The nominate (Lake Van area) and *hakkariensis* Schmidtler & Eiselt, 1991 (extreme SE Anatolia).

R e m a r k s . NAGY *et al.* (2003) pull down *hakkariensis* to the subspecific level on the base of molecular data.

Genus ***Elaphe*** Fitzinger, 1833

Elaphe dione (Pallas, 1773)

Coluber dione Pallas, 1773

Type locality. Restricted to Gratscheffskoi, Irtysh river valley, Semipalatinsk district, Kazakhstan by MERTENS & MÜLLER (1928).

Range. Extreme SE Ukraine, Ciscaucasia, Transcaucasia and E Turkey.

Extralimital distribution. C Asia east to the Pacific coast; northern limit about to 55° N; south to N Iran, N Afghanistan and about 30° N in China (SCHULZ 1996).

Distribution pattern. Palaearctic (Central and E Asiatic).

Subspecies. Usually considered monotypic, but populations of extreme E Russia might be separated as *Elaphe dione czerskii* (Nikolsky, 1914).

Elaphe quatuorlineata (Lacépède, 1789)

Coluber quatuorlineatus Lacépède, 1789

Type locality. Provence, France (in error).

Range. C and S Italy (not Sicily), E Adriatic coast (N to Istria), Albania, Macedonia, Greece and SW Bulgaria.

Distribution pattern. Palaearctic (E Mediterranean).

Subspecies. The nominate subspecies and *muenteri* Bedriaga, 1882 (Cyclades).

R e m a r k s . According to LENK *et al.* (2001), DNA analysis shows that, despite striking different colour pattern, *E. rechingeri* Werner, 1932 from Amorgos (Cyclades Is.) is synonym of *E. quatuorlineata*.

Elaphe sauromates (Pallas, 1814)

Coluber sauromates Pallas, 1814

Type locality. Restricted to Isthmus near Perekop, Tauria, Ukraina by MERTENS & MÜLLER (1928).

Range. NE Greece, SW Bulgaria, Romania, Moldova, S Ukraina, S Russia, Transcaucasia, Anatolia, Lebanon, Syria (Mt. Hermon).

Extralimital distribution. W Iran, W Kazakhstan, W Turkmenistan.

Distribution pattern. Palaearctic (Turanian-E Mediterranean).

Subspecies. Monotypic.

R e m a r k s . According to DNA analysis carried out by LENK *et al.* (2001), the genetic differentiation between one specimen from Kazakhstan and those from Middle East was comparable to that resulted between *sauromates* and *quatuorlineata*.

Genus *Hemorrhois* Boie, 1826

Hemorrhois algirus (Jan, 1863)

Periops algira Jan, 1863

Type locality. Sfax, Tunisia.

Range. W Sahara, S Morocco, Algeria (N Algeria and Hoggar), Tunisia, N Libya, NW Egypt. Introduced in Malta.

Extralimital distribution. N Mauritania (SCHÄTTI 1986).

Distribution pattern. Palearctic (N-African).

Subspecies. According to SCHÄTTI (1986), the nominate subspecies from NW Algeria eastwards, and *intermedius* Werner, 1929 from Monts des Ksour (NW Algeria) westwards.

Hemorrhois hippocrepis (Linnaeus, 1758)

Coluber hippocrepis Linnaeus, 1758

Type locality. "América" (in error).

Range. Iberian Peninsula, Morocco (N of Atlas Mts.), N Algeria, N Tunisia, Pantelleria Is. (Italy), Sardinia (perhaps introduced).

Distribution pattern. Palearctic (W Mediterranean).

Subspecies. Monotypic.

R e m a r k s . CATTANEO (1985) described the subspecies *nigrescens* from Pantelleria, of doubtful validity.

Hemorrhois nummifer (Reuss, 1834)

Coluber nummifer Reuss, 1834

Type locality. Egypt.

Range. Transcaucasia, S Anatolia, Syria, Lebanon, Jordan, Israel, Sinai, N Egypt, Cyprus, Rhodes, some E Aegean islands.

Extralimital distribution. N Iraq, W Iran, S Turkmenistan (Kopet Dag) E to Tajikistan, Kirghizstan and S Kazakhstan (SCHÄTTI & AGASJAN 1985).

Distribution pattern. Palaearctic (Turano-E Mediterranean).

Subspecies. Monotypic.

R e m a r k s . *Coluber ravergeri chernovi* Mertens, 1952 was synonymized by AGASJAN (1986) with *C. nummifer*.

Hemorrhois ravergeri (Ménétries, 1832)

Coluber ravergeri Ménétries, 1832

Type locality. Baku, Azerbaijan.

Range. E Anatolia, Transcaucasia, Daghestan; isolated populations on mountains of Lebanon, Syria and Jordan (Mt. Lebanon, Mt. Hermon and Jabal Druz).

Extralimital distribution. N Iraq, Iran, Caspian Sea E to Sinkiang in China and SE to Afghanistan and W Pakistan (SCHÄTTI & AGASJAN 1985).

Distribution pattern. Palaearctic (Centralasiatic-SW Asiatic).

Subspecies. Monotypic.

R e m a r k s . Molecular data suggest that this taxon is paraphyletic, with close relationship to *H. nummifer* (SCHÄTTI & UTIGER 2001). The subspecies *plumbeus* Cernov, 1926, recorded from Nakhichevan, is a synonym of *Hemorrhois nummifer*.

Genus ***Hierophis*** Fitzinger, 1843

SCHÄTTI & MONSCH (2004) restrict the genus *Hierophis* only to the species *H. viridiflavus*, *H. gemonensis* and *H. cypriensis*.

Hierophis cypriensis (Schätti, 1985)

Coluber cypriensis Schätti, 1985

Type locality. Between Arakapàs and Kalokhorio, Limassol, Cyprus.

Range. Cyprus. Endemic.

Distribution pattern. Palaearctic (E Mediterranean, Cypriot endemic).

Subspecies. Monotypic.

Hierophis gemonensis (Laurenti, 1761)

Natrix gemonensis Laurenti, 1768

Type locality. Gemona, Italy (where the species is absent).

Range. E Adriatic coast N to Istria (records from Trieste are doubtful), W Greece (including Ionian Is., Peloponnesus, Crete, Euboea).

Distribution pattern. Palaearctic (Mediterranean, Balkanian endemic).

Subspecies. Monotypic.

Remarks. The name *gemonensis* is a *nomen conservandum*. SCHÄTTI & LANZA (1987) demonstrate that *Natrix gemonensis* is an older synonym of *Coluber viridiflavus*, because the type locality is only inhabited by this latter species. The correct name should have been *Coluber laurenti* (Bedriaga, 1882).

Hierophis viridiflavus (Lacépède, 1789)

Coluber viridi-flavus Lacépède, 1789

Type locality. S France.

Range. Spain (Pyrenees), France, Italy and most islands, Dalmatia (Croatia).

Distribution pattern. Palaearctic (S European).

Subspecies. Monotypic. The subspecies *carbonarius* Bonaparte, 1833 has been synonymized by SCHÄTTI & VANNI (1986), but recently UTIGER & SCHÄTTI (2004) revalidate at the subspecific level *H. v. carbonarius* (Bonaparte), consisting of all the melanotic populations. The disjunct distribution of this subspecies (NE Italy, Slovenia and NW Croatia vs. S Italy and Sicily) seems however difficult to explain.

The same authors consider *Coluber gemonensis gyarosensis* Mertens, 1968 from Gyaros Island (Cyclades) as a synonym of *H. v. carbonarius*, most probably originated from an introduction in historical times.

Genus ***Lamprophis*** Fitzinger, 1843

Lamprophis fuliginosus (Boie, 1827)

Lycodon fuliginosus Boie, 1827

Type locality. "Java" (error, misspelled for Africa).

Range. A relict sub-range in SW Morocco.

Extralimital distribution. Most of Sub-Saharan Africa (S to Cape of Good Hope) and SW Arabia (Yemen).

Distribution pattern. Afrotropical (Subsaharan-SW Arabian).

Subspecies. The nominate subspecies within the study area.

R e m a r k s . Another species belonging to the Lycophidinae, *Lycophidion capense* (A. Smith, 1840), is quoted for Egypt (Fayum) on the basis of an old specimen (FLOWER 1933), but its occurrence N of the Sahara has never been confirmed.

Genus *Lytorhynchus* Peters, 1863

Lytorhynchus diadema (Duméril, Bibron & Duméril, 1854)

Heterodon diadema Duméril, Bibron & Duméril, 1854

Type locality. Algeria.

Range. Saharan Morocco, Algeria, Tunisia, Libya, Egypt; E Syria, Israel, Jordan, Sinai.

Extralimital distribution. Arabian Peninsula and Iraq; a few records from Mauritania, Niger and NE Sudan, but probably more widespread in the Sahel.

Distribution pattern. Palearctic (Saharo-Sahelo-Arabian).

Subspecies. The subspecific arrangement is controversial. The nominate subspecies occurs in Africa; *gaddi* Nikolsky, 1907 in Arabian peninsula, Iraq and SW Iran is often regarded as a synonym (including *arabicus* Haas, 1952 and *mesopotamicus* Haas, 1952).

Lytorhynchus kennedyi Schmidt, 1939

Lytorhynchus kennedyi Schmidt, 1939

Type locality. "from between Homs and Palmyra" (Syria).

Range. Syria and Jordan; an isolated finding in NE Libya (Cyrenaica) (MORAVEC 1995).

Extralimital distribution. W Iraq.

Distribution pattern. Palaearctic (probably a Syrian desert endemic).

Subspecies. Monotypic.

Remarks. The taxonomic status of this species is still doubtful. SCHMIDT (1939) describes *Lytorhynchus kennedyi* "from between Homs and Palmyra", on the basis of the extremely characteristic colour pattern and the presence of 3/3 preoculars and 10 lower labials. LEVITON & ANDERSON (1970) provisionally consider it at the species level, because these authors "suspect future collecting will turn up individuals intermediate between *L. kennedyi* and *L. diadema* [...]". GASPERETTI (1988) and MARTENS (1993) consider *kennedyi* at the specific level; MORAVEC (1995) and DISI *et al.* (2001) consider it as a rare pattern morph of *L. diadema*.

Because *L. kennedyi* seems to be by far the typical (although rare) *Lytorhynchus* in the Syrian Desert area (including E Jordan), and there is at least one evidence of sympatry with *L. diadema* (MARTENS 1993), we agree with GASPERETTI (1988) and MARTENS (1993) in considering *L. kennedyi* at the specific status. However, the enigmatic Libyan specimen creates confusion to this framework.

Genus *Macroprotodon* Guichenot, 1850

Macroprotodon cucullatus (Geoffroy St.Hilaire, 1827)

Coluber cucullatus Geoffroy in Savigny, 1827

Type locality. Lower Egypt.

Range. Iberian Peninsula (including Balearic Is.), Lampedusa Is. (Italy), Morocco, N Algeria, Hoggar, Tunisia, coastal Libya, N Egypt, extreme NE Sinai and SW Israel.

Distribution pattern. Palaearctic (Mediterranean).

Subspecies. BUSACK & MCCOY (1990) recognize the following subspecies: the nominate from Western Sahara, Hoggar, S Tunisia eastward to Israel; *brevis* (Günther, 1862) from Morocco N of Atlas Mts; *ibericus* Busack & McCoy, 1990 from Iberian peninsula; *mauritanicus* Guichenot, 1850 from E Morocco to N Tunisia, including Balearic Is. and Lampedusa (Italy).

WADE (2001) recognises at specific level *M. cucullatus* (the typical form from S Tunisia to Israel, the form "*textilis*" from central Tunisia, NW Sahara, Hoggar and Lampedusa Is.; this form is considered as subspecies by GENIEZ *et al.* 2004), *M. brevis* (Iberian peninsula and W Morocco) and *M. mauritanicus* (NE Algeria and N Tunisia) and describes *M. abubakeri* (NE Morocco and NW Algeria), while *ibericus* is synonymized with *brevis*. However, on the basis of the wide overlap of the characters and the patterns of distributions, it seems preferable to retain these taxa as subspecies, until other proofs will emerge.

Genus *Malpolon* Fitzinger, 1826

Malpolon moilensis (Reuss, 1834)

Coluber moilensis Reuss, 1834

Type locality. Moilah (= Al Muwaylih), Saudi Arabia.

Range. Syria, Jordan, Israel; S Morocco, Algeria, Tunisia, Libya, Egypt, Sinai.

Extralimital distribution. Sahel (Mauritania to Sudan), Arabian Peninsula, Iraq, SW Iran.

Distribution pattern. Palaearctic (Saharo-Arabian).

Subspecies. Monotypic.

R e m a r k s . BRANDSTÄTTER (1995) proposes to include this species in the monospecific genus *Scutophis*, on the basis of the scales microornamentation. We prefer to maintain the traditional nomenclature until further and more relevant studies are available.

Malpolon monspessulanus (Hermann, 1804)

Coluber monspessulanus Hermann, 1804

Type locality. Montpellier, restricted by MERTENS & MÜLLER (1928).

Range. Iberian Peninsula, S France, NW Italy (W Liguria), E Adriatic coast, S Balkans, Ionian and Aegean Is., Anatolia, Cyprus, Syria, Lebanon, Israel, Jordan, Transcaucasia, E Ciscaucasia; Morocco, Algeria, Tunisia, Lampedusa Is. (Italy), N Libya, N Egypt.

Extralimital distribution. Iran, Iraq.

Distribution pattern. Palaearctic (Mediterranean-SW Asiatic).

Subspecies. The nominate subspecies in SW Europe, Western Sahara, Morocco and extreme NW Algeria, *insignitus* (Geoffroy, 1827) in the rest of the range. However, according to DE HAAN (1997) the populations of E Europe and most of the Middle East should be referred to the ssp. *fuscus* (Fleischmann, 1831).

CARRANZA *et al.* (2006) propose, on the basis of molecular data, to raise at species level the eastern populations currently assigned to the ssp. *insignitus*, as well as to recognize the validity of the ssp. *fuscus*.

Genus *Natrix* Laurenti, 1768

Natrix maura (Linnaeus, 1758)

Coluber maurus Linnaeus, 1758

Type locality. "Algiriae" (= Algeria).

Range. Iberian Peninsula, Balearic Is., France, NW Italy, Sardinia, Corsica (introduced), Morocco, N Algeria, Tunisia, NW Libya.

Distribution pattern. Palaearctic (W Mediterranean).

Subspecies. Monotypic.

Natrix natrix (Linnaeus, 1758)

Coluber natrix Linnaeus, 1758

Type locality. Sweden, restricted by MERTENS & MÜLLER (1928).

Range. Most of Europe (including Corsica, Sardinia and Sicily), Anatolia, Transcaucasia (Nagorno-Karabakh), Cyprus, NW Syria, NE Morocco, N Algeria and N Tunisia. Other data for Middle East are not adequately supported.

Extralimital distribution. Central Asia and Siberia (to the Bajkal Lake), N Nei Mongol, China, S to Aral and Balkash Lakes; N Iran.

Distribution pattern. Palaearctic (Centralasiatic-Europeo-Mediterranean).

Subspecies. Several subspecies have been described up to now. *Natrix n. natrix* (Linneaus, 1758) from Central and Eastern Europe, *N. n. astreptophora* (Seoane, 1884) in Iberian Peninsula and Maghreb; *N. n. calabra* Lanza, 1983, from Calabria (S Italy); *N. n. sicula* (Cuvier, 1829), from Sicily and Calabria; *N. n. cettii* Gené, 1838, from Sardinia; *N. n. corsa* (Hecht, 1930) from Corsica; *N. n. fusca* Cattaneo, 1990, from Kea Is. (Cyclades); *N. n. gotlandica* Nilson & Andrén, 1981, from Gotland Is. in Baltic Sea; *N. n. helvetica* (Lacépède, 1789) from Western Europe east to the Rhine; *N. n. lanzai* Kramer, 1970, from peninsular Italy; *N. n. persa* (Pallas, 1814) from S Balkans, Near East, Transcaucasia, N Iran; *N. n. schweizeri* L. Müller, 1932, from Milos Is. and Kimolos Is. (Cyclades); *N. n. scutata* (Eichwald, 1771), from Dnjepr and Crimea eastwards.

Following the subspecific concept proposed by THORPE (1975), only four subspecies are valid: *natrix*, *cetti*, *corsa* and *helvetica*.

R e m a r k s . *Natrix megalcephala* Orlov & Tuniyev, 1986 is a taxon of doubtful validity, probably only a subspecies of *N. natrix*.

***Natrix tessellata* (Laurenti, 1768)**

Coronella tessellata Laurenti, 1768

Type locality. "In Japidia, vulgo Cars" (= NW Croatia).

Range. C and S Europe (W to Italy and W Germany), Crete, Anatolia, Transcaucasia, Syria, Lebanon, Jordan and Israel; Egypt (only Nile Delta).

Extralimital distribution. Iraq, Iran, Central Asia (N to about 50° N, S to N Afghanistan, E to W China and SW Mongolia). Also quoted for Chitral in N Pakistan (WALL 1923).

Distribution pattern. Palearctic (Centralasiatic-European).

Subspecies. Monotypic.

Genus ***Platyceps*** Blyth, 1860

***Platyceps collaris* (Müller, 1878)**

Zamenis dhalii var. *collaris* Müller, 1878

Type locality. Beirut, Lebanon.

Range. W and S Anatolia, Syria, Lebanon, Israel, Jordan. European coasts of Black Sea (SE Bulgaria and Thrace). Endemic.

Distribution pattern. Palaearctic (E Mediterranean).

Subspecies. Monotypic. The ssp. *thracius* Rehák, 1985 (European range and one locality for the Asiatic side of Bosphorus) is not valid according to SCHÄTTI *et al.* (2001).

R e m a r k s. Previously known as *Coluber rubriceps* Venzmer, 1919.

Platyceps elegantissimus (Günther, 1878)

Zamenis elegantissimus Günther, 1878

Type locality. East of Al Muwaylih (NW Saudi Arabia).

Range. Israel (Wadi Araba), SW Jordan.

Extralimital distribution. W and C Saudi Arabia.

Distribution pattern. Palaearctic (Arabian endemic).

Subspecies. Monotypic.

Platyceps florulentus (Geoffroy, 1827)

Coluber florulentus Geoffroy St.Hilaire, 1827

Type locality. Egypt. Type presumably lost, according to SCHÄTTI (1988).

Range. Egypt.

Extralimital distribution. Egypt, Sudan, Eritrea, Ethiopia, Somalia, Kenya, Cameroon, Nigeria (SCHÄTTI 1988b).

Distribution pattern. Afrotropical (NE Afrotropical-Sahelian).

Subspecies. The nominate subspecies occurs in Egypt, Sudan, Eritrea, Ethiopia and N Somalia; *keniensis* Parker, 1932 from W Kenya and *perreti* Schätti, 1988 from E Nigeria and N Cameroon.

***Platyceps najadum* (Eichwald, 1831)**

Tyria najadum Eichwald, 1831

Type locality. Baku, Azerbaijan.

Range. E Adriatic coast, S Balkans including Ionian and a few Aegean Is., Anatolia, Syria, Lebanon, Caucasus and Transcaucasia.

Extralimital distribution. Iran and S Turkmenistan.

Distribution pattern. Palaearctic (Turano-Mediterranean).

Subspecies. The nominate subspecies (E Asia Minor and other non European areas, excepting Kopet Dag), *dahlia* Schinz, 1833 (Balkans and W Asia Minor) and *atayevi* (Tuniyev & Shammakov, 1993) (Kopet Dag, Turkmenistan and probably adjoining Iran). The validity of the subspecies *kalymnensis* Schneider, 1979 (Kalymnos Id., Greece) and *albitemporalis* Darevsky & Orlov, 1994 (SE Azerbaijan) is debated.

R e m a r k s . Most of the old records of this species in Israel, Jordan and Lebanon might be referred to *Platyceps collaris*.

The *Platyceps rhodorhachis* complex

According to SCHÄTTI & MCCARTHY (2004), *Platyceps rhodorhachis* Auct. is a complex of taxa ranging from N Africa (SE Algeria) and from the Horn of Africa to extreme S Kazakhstan and NW India. The same authors point out that the overall distribution shows a significant geographic gap, which comprises most of Iraq, northern (except for the extreme northwestern part) and central Saudi Arabia and eastern Jordan. Such distributional discontinuity and morphological data argue for the existence of two distinct taxa, at least in the study area, one of which has still an uncertain status.

***Platyceps* sp.**

Range. N Egypt; Jordan, S Israel.

Distribution pattern. Palaearctic (Levantine endemic).

R e m a r k s . The Egyptian records refer to specimens labelled “vicinity of Cairo”, which need further confirmation. No records are so far known for Sinai.

Platyceps saharicus Schätti & McCarthy, 2004

Type locality. St. Catherine's Monastery area, Wadi el Sheikh (Sinai, Egypt).

Range. SE Algeria, Libya, Egypt; Sinai, SW Jordan, Israel, West Bank. The westernmost records are quite scattered: it is quoted only from Hoggar and Tassili in Algeria (ANGEL & LHOTE 1938) and from Ain Murr in SE Libya (SCORTECCI 1935).

Extralimital distribution. Chad, Sudan (Nubia); NW Arabian Peninsula.

Distribution pattern. Palaearctic (Saharan, with northwestern Arabian extension).

Subspecies. Monotypic.

Remarks. The W Arabian records currently assigned to *Platyceps rhodorhachis* auct., characterised by a high ventral count, might belong to this taxon (SCHÄTTI & MCCARTHY, 2004).

Platyceps rogersi (Anderson, 1893)

Zamenis rogersi Anderson, 1893

Type locality. Lower Egypt.

Range. NE Libya, N Egypt, Sinai, Israel, Jordan, Syria.

Extralimital distribution. See remarks.

Distribution pattern. Palaearctic (E Mediterranean).

Subspecies. Monotypic.

Remarks. As pointed out by DISI *et al.* (2001), in the literature there are no reliable diagnostic characters to distinguish *Platyceps rogersi* from *P. ventromaculatus* (Gray, 1834).

On the basis of molecular data (SCHÄTTI & UTIGER, 2001) *P. ventromaculatus*, described from India and possibly ranging only E of the Indus river (KHAN 1997), is well differentiated from the Middle Eastern *P. rogersi*. What remains unclear is whether "*P. ventromaculatus*" from Persian Gulf, Euphrates River valley and Eastern Syria are truly belonging to this species or they could be misinterpreted *P.*

rogersi. Unfortunately GASPERETTI (1988) did not consider *P. rogersi* in his monograph.

***Platyceps ventromaculatus* (Gray, 1834)**

Coluber ventromaculatus Gray, 1834

Type locality. Not indicated.

Range. The existence of the species in the area is questionable due to the possible confusion with *P. rogersi*. Within the study area, the species is quoted from SE Turkey by BARAN (1982) and KUMLU-TAŞ *et al.* (2002), from Syria by ANGEL (1936) and LYMBERAKIS & KALIONZOPOULOU (2003) and from Jordan by DISI (1993) and DISI *et al.* (1999).

Extralimital distribution. Iraq, Kuwait, E Saudi Arabia, SW Iran, Pakistan, N India (KHAN 1997).

Distribution pattern. Palaearctic (Sindo-Arabian).

Subspecies. The nominate subspecies in the study area and in most of the range; KHAN & KHAN (2000) described the ssp. *bengalensis*, from Bangladesh westwards to NE Pakistan, and *indusai* from Pakistan (Indus valley).

Remarks. All data from Jordan have been assigned to *P. rogersi* by DISI *et al.* (2001), while HAAS (1951) quotes as *P. rogersi* the Palmyra specimen of Angel (*op. cit.*). The determinations of the specimens from Turkey and the E Syria need to be verified.

Genus ***Psammophis*** Boie, 1826

***Psammophis aegyptius* Marx, 1958**

Type locality. Siwa, Siwa Oasis, Western Desert Governorate, Egypt.

Range. Libya, Egypt, extreme S Israel (WERNER 1998). Quoted also for Sinai (WERNER 1973).

Distribution pattern. Palaearctic (E Saharian).

Subspecies. Monotypic.

Psammophis lineolatus (Brandt, 1838)

Coluber (Taphrometopon) lineolatus Brandt, 1838

Type locality. Transcaspia.

Range. Nakhichevan (Azerbaijan).

Extralimital distribution. From the Caspian Sea eastwards in the Turan to Mongolia and NW China, south to Pakistan, Afghanistan and Iran.

Distribution pattern. Palaearctic (Centralasiatic).

Subspecies. Monotypic.

Psammophis schokari (Forskål, 1775)

Coluber schokari Forskål, 1775

Type locality. Yemen.

Range. S Morocco, Algeria, Tunisia, Libya, Egypt; Syria, Lebanon, Israel, Jordan, Sinai.

Extralimital distribution. Sahara and Sahel, Arabian Peninsula, Iraq, Iran, Turkmenistan (Kopet Dag), Iran, S Afghanistan, Pakistan and NW India.

Distribution pattern. Palaearctic (Saharo-Sahelo-Turano-Sindian).

Subspecies. Monotypic.

Psammophis sibilans (Linnaeus, 1758)

Coluber sibilans Linnaeus, 1758

Type locality. "Asia", in error for Egypt.

Range. Lower Egypt only, according to BRANDSTÄTTER (1995).

Extralimital distribution. Sub-Saharan Africa.

Distribution pattern. Afrotropical (Subsaharan *sensu* LA GRECA 1990).

Subspecies. Monotypic.

R e m a r k s . Several past records of the species for other regions of N Africa should be ascribed to *P. schokari*.

***Psammophis tanganicus* Loveridge, 1940**

Psammophis biseriatus tanganicus Loveridge, 1940

Type locality. Mangasini (= Kwa Mtoro), Usandawi, Tanzania.

Range. Quoted for SW Libya.

Extralimital distribution. S Ethiopia, Somalia, Eritrea, Kenya, Tanzania.

Distribution pattern. E African (*sensu* LA GRECA 1990).

Subspecies. Monotypic.

R e m a r k s . The species was quoted for SW Libya (Fezzan area) as *P. biseriatus* by SCORTECCI (1937), reported also by ZAVATTARI (1937) and LOVERIDGE (1940). KRAMER & SCHNURRENBERGER (1963) examined a male specimen from Ghat (collection Kramer), having 15 scales at midbody and 3 supralabials touching the eye. No recent author quotes this species either for the study area (SCHLEICH *et al.* 1996) or for adjacent Sahel (CHIPPAUX 1999). The only *Psammophis* living in desert areas of the southern Sahara are *P. schokari* and perhaps *P. sibilans* (see CHIPPAUX 1999), both species with 17 midbody scales.

Genus ***Rhinechis*** Michahelles (in Wagler), 1833

***Rhinechis scalaris* (Schinz, 1822)**

Coluber scalaris Schinz, 1822

Type locality. S France.

Range. Iberian Peninsula, S France east to the Italian border. Minorca Is. (introduced).

Distribution pattern. Palearctic (W Mediterranean).

Subspecies. Monotypic.

R e m a r k s . This species was usually reported as *Elaphe*.

Genus *Rhynchocalamus* Günther, 1864

Rhynchocalamus melanocephalus (Jan, 1862)

Homalosoma melanocephalus Jan, 1862

Type locality. Beirut, Lebanon.

Range. S and SE Anatolia, S Armenia, Nakichevan (Azerbaijan), Syria, Lebanon, Israel, Jordan and S Sinai; an old record from Egypt (ANDERSON 1898: 'Cairo') never reconfirmed.

Extralimital distribution. NW Iraq, W Iran.

Distribution pattern. Palaearctic (SW-Asiatic).

Subspecies. The nominate subspecies in the Mediterranean part of the range and the ssp. *satunini* (Nikolsky, 1899) in the other areas.

R e m a r k s . The genus *Rhynchocalamus* includes only a second species in SW Arabian Peninsula (*R. arabicus* Schmidt, 1933).

Genus *Spalerosophis* Jan, 1865

Spalerosophis diadema (Schlegel, 1837)

Coluber diadema Schlegel, 1837

Type locality. Shiraz, Iran.

Range. NW Western Sahara, SW Morocco, Algeria (including Hoggar), Tunisia, Libya, Egypt, Sinai; extreme S Anatolia, Syria, Israel, Jordan.

Extralimital distribution. Arabian Peninsula, Middle East N to Turan and E to N India.

Distribution pattern. Palaearctic (Saharo-Arabian-Turano-Sindian).

Subspecies. In the study area the ssp. *cliffordi* (Schlegel, 1837), from Sahara, Sahel, Arabia and Middle East. The nominate one occurs in Pakistan and NW India; *schiraziana* Jan, 1865 from Iran, Afghanistan, W Pakistan and Turan. These taxa are sometimes considered as distinct species.

Remarks. The young specimen quoted by WERNER (1937: 33) from Hoggar has been assigned to *S. d. cliffordi*, following PASTEUR (1967).

***Spalerosophis dolichospilus* (Werner, 1923)**

Zamenis diadema Schlegel var. *dolichospila* Werner, 1923

Type locality. Ain Sefra, Algeria.

Range. Morocco (S of High Atlas and in the Moulouya Valley), N Algeria, N Tunisia.

Distribution pattern. Palaearctic (Saharian, NW Saharian).

Subspecies. Monotypic.

Genus ***Telescopus*** Wagler, 1830

The *Telescopus dhara* complex

Species group whose systematic relationships are still controversial: GASPERETTI (1988) and BONS & GENIEZ (1996) use the subspecific status for *obtusus*, while BÖHME *et al.* (1989) and SCHLEICH *et al.* (1996) rise *obtusus* to specific rank.

As for *T. tripolitanus* Werner 1909 (including *Pseudotarbohis gabesiensis* Domergue, 1955), it was considered synonym of *T. obtusus* by the majority of the authors, but deserving specific status according to ROMAN (1977) and CHIPPAUX (1999).

Further to this uncertain situation, a list of currently recognised species is herewith provided.

***Telescopus dhara* (Forskål, 1775)**

Coluber dhara Forskål, 1775

Type locality. Yemen.

Range. Sinai, Israel (Wadi Araba and Jordan River valley, N to Mt. Gilboa) and Jordan.

Extralimital distribution. Most of the Arabian peninsula.

Distribution pattern. Arabian.

Subspecies. Monotypic.

R e m a r k s . Reports of this species in N Africa are referable to other taxa (see below).

Telescopus obtusus Reuss, 1834

Coluber obtusus Reuss, 1834

Type locality. Egypt.

Range. Egypt (mainly Nile Valley). Records from Libya westwards belong probably to *T. tripolitanus* (as *T. guidimakaensis*; see GENIEZ *et al.* 2004).

Extralimital distribution. Chad to Somalia and N Kenya.

Distribution pattern. Saharan-Sahelian-NE Afrotropical.

Subspecies. Monotypic.

Telescopus tripolitanus (Werner, 1909)

Leptodira tripolitana Werner, 1909

Type locality. Tripoli.

Range. S Tunisia and NW Libya, N Algeria, Hoggar, S Morocco, Western Sahara.

Extralimital distribution. Very poorly known. According to CHIPPAUX (1999), it should include the Sahel (Mauritania to Somalia). According to GENIEZ *et al.* (2004), it should be in Sahel areas of Mauritania, Mali and Nigeria.

Distribution pattern. Sahelian - Saharan.

Subspecies. Monotypic.

R e m a r k s . This species has been recorded under different names: *Pseudotarbohis gabesiensis* Domergue, 1955 (DOMERGUE 1955), *T. obtusus* by BOHME *et al.* (1989), *T. guidimakaensis* (Chabanaud, 1916) by GENIEZ *et al.* (2004), *T. dhara* ssp. *obtus* by BONS & GENIEZ (1996).

The *Telescopus fallax* complex

The *Telescopus fallax* complex includes a group of species or semispecies whose systematics is still to be clarified, especially in Middle East.

ZINNER (1977) considers *hoogstraali* as subspecies of *T. fallax*, showing a north-south cline in Israeli populations in those morphological features usually utilised to separate the two forms. As for *T. nigriceps*, MARTENS (1993) states that the assessment of the systematic status of this taxon cannot be defined, until further specimens will be available. On the contrary, DISI *et al.* (2001) treat both *hoogstraali* and *nigriceps*, as full species.

Telescopus fallax (Fleischmann, 1831)

Tarbophis fallax Fleischmann, 1831

Type locality. Trieste, restricted by MERTENS & MÜLLER (1928).

Range. E Adriatic coast (from extreme NE Italy southwards), S Balkans (including Crete, Ionian and Aegean Is.), Anatolia, Transcaucasia (coastal Daghestan included), Syria, Lebanon, Israel, Jordan. Introduced in Malta.

Extralimital distribution. N Iran.

Distribution pattern. Palaearctic (Turano-Balkan).

Subspecies. The nominate subspecies occurs in the Aegean; the ssp. *iberus* (Eichwald, 1831) in central Anatolia and in northeastern part of range; the ssp. *syriacus* (Boettger, 1880) from SE Anatolia to S Israel; the ssp. *cypriaca* Barbour & Amaral, 1927 in Cyprus. DISI *et al.* (2001) consider *T. f. syriacus* not present in Jordan, after examinationn of the type specimen, .

Telescopus hoogstraali Schmidt & Marx, 1956

Type locality. Wadi el Sheikh, St. Catherine's Monastery area, Sinai.

Range. Sinai; S Israel and SW Jordan.

Distribution pattern. Palearctic (SW Asiatic, Sinai and NW Arabian endemic).

Subspecies. Monotypic.

Telescopus nigriceps Ahl, 1924

Tarbophis nigriceps Ahl, 1924

Type locality. “Central Mesopotamia”.

Range. NE Lebanon (ZINNER 1967), Syria (MARTENS 1993), NW Jordan (HAAS 1943; DISI *et al.* 1988a; AL ORAN *et al.* 1994).

Extralimital distribution. *Terra typica* is “Central-Mesopotamien” (Ahl 1924), but MARTENS (1993) argues that the holotype could come from Syria.

Distribution pattern. Palearctic (SW Asiatic, N Arabian endemic).

Subspecies. Monotypic.

Genus ***Zamenis*** Wagler, 1830

Zamenis hohenackeri (Strauch, 1873)

Coluber hohenackeri Strauch. 1873

Type locality. Chanlar, Azerbaijan, restricted by BISCHOFF (1993).

Range. Russia (E Ciscaucasia), Transcaucasia, E and S Anatolia, Lebanon (Mt. Lebanon range), Syria (Mt. Hermon).

Extralimital distribution. NW Iran.

Distribution pattern. Palearctic (SW Asiatic).

Subspecies. In the past, two subspecies were recognised, the nominate and *taurica* (Werner, 1898), synonymized by NILSON & ANDRÉN (1984).

Zamenis lineatus (Camerano, 1891)

Callopeltis longissimus var. *lineata* Camerano, 1891

Type locality. Naples, Italy.

Range. S Italy and Sicily.

Distribution pattern. Palearctic (S European, S Italic endemic).

Subspecies. Monotypic.

R e m a r k s . LENK & WÜSTER (1999) distinguish *Z. lineatus* as distinct species (or semi-species) on molecular basis.

Zamenis longissimus (Laurenti, 1768)

Coluber longissimus Laurenti, 1768

Type locality. Vienna, Austria, restricted by MERTENS & MÜLLER (1928).

Range. C and S Europe (including Sardinia, where it was introduced in historical times), Balkans, Anatolia (Black Sea coast and Mt. Ararat area), S Ukraine, SW Russia (Krasnodar), W Georgia and possibly Armenia.

Extralimital distribution. NW Iran.

Distribution pattern. Palearctic (S European with Caucasian and Anatolian extension).

Subspecies. Monotypic.

Zamenis persicus (Werner, 1913)

Coluber longissima var. *persica* Werner, 1913

Type locality. Barferush, Mazandaran prov., Iran.

Range. SE Azerbaijan (Lenkoran).

Extralimital distribution. N Iran.

Distribution pattern. Palearctic (SW Asiatic, N Iranian endemic).

Subspecies. Monotypic.

Zamenis situla (Linnaeus, 1758)

Coluber Situla Linnaeus, 1758

Type locality. Restricted to Izmir, Turkey (BODENHEIMER 1944).

Range. S Italy (Apulia and Sicily), Malta, E Adriatic coast (N to Istria), Greece, Crete, Ionian and Aegean Is., S Bulgaria, S Crimea, W Anatolia.

Distribution pattern. Palearctic (E Mediterranean).

Subspecies. Monotypic.

Family ATRACTASPIDIDAE

[following UNDERWOOD & KOCHVA (1993)].

Genus *Atractaspis* Smith, 1849

Atractaspis engaddensis Haas, 1950

Type locality. Ein Geddi (Israel).

Range. Israel, Jordan, Sinai.

Distribution pattern. Palearctic (SW Asiatic, Sinai and NW Arabian endemic).

Subspecies. Monotypic.

R e m a r k s . Full species status in agreement with WERNER (1998), although other authors (i.e. GASPERETTI 1988) consider *engaddensis* as a subspecies of *Atractaspis microlepidota* Günther, 1866.

Genus *Micrelaps* Boettger, 1880

Micrelaps muelleri Boettger, 1880

Type locality. Near Jerusalem (Israel).

Range. Israel, NW Jordan, Lebanon, W Syria. Endemic.

Distribution pattern. Palearctic (Mediterranean, Levantine endemic).

Subspecies. Monotypic.

R e m a r k s . The genus *Micrelaps* was so far included in the Colubridae Aparallactinae.

WARNER *et al.* (2006) describe *M. tchernovi* from central Jordan Valley, mainly on the basis of colour characters.

Family ELAPIDAE

Genus *Naja* Laurenti, 1768*Naja haje* (Linnaeus, 1758)

Coluber haje Linnaeus, 1758

Type locality. "Aegypto inferiore" (= Lower Egypt).

Range. Western Sahara, S Morocco, Algeria, Tunisia, N Libya, Egypt.

Extralimital distribution. S and W Arabian Peninsula; sub-Saharan Africa south to Democratic Republic of Congo and Tanzania.

Distribution pattern. Afrotropical with North African and Arabian extensions.

Subspecies. The nominate subspecies (most of African sub-range), the ssp. *arabica* Scortecci, 1932 (Arabian Peninsula) and the ssp. *legionis* Valverde, 1989 (from Western Sahara to Tunisia).

Naja nubiae Wüster & Broadley, 2003

Type locality. Kom Ombo (= Kawn Umbû), Aswan Governorate, Egypt.

Range. Egypt (Nile valley).

Extralimital distribution. Chad, Sudan, Eritrea, Ethiopia, Somalia, Kenya, Tanzania.

Distribution pattern. NE African-Egyptian (*sensu* CARPANETO & PIATTELLA 1990).

Subspecies. Monotypic.

R e m a r k s . According to WÜSTER & BROADLEY (2003), past Egyptian data of *Naja mossambica* Peters, 1854, *N. pallida* Boulenger, 1896 or *N. nigricollis* Reinhardt, 1843 are referable to this species.

Genus *Walterinnesia* Lataste, 1887*Walterinnesia aegyptia* Lataste, 1887

Type locality. Cairo (Egypt) (purchased).

Range. NE Egypt, Sinai, Israel, W Jordan, Syria, SE Turkey.

Extralimital distribution. Saudi Arabia, Iraq, SW Iran.

Distribution pattern. Palearctic (Arabian - SW-Asiatic).

Subspecies. Monotypic.

R e m a r k s. The occurrence in Syria, not demonstrated up to now (MARTENS 1997) is here confirmed on the basis of two preserved specimens studied by the authors and published by SINDACO *et al.* (2006).

Family VIPERIDAE

Genus *Bitis* Gray, 1842

Bitis arietans (Merrem, 1820)

Vipera (Echidna) arietans Merrem, 1820

Type locality. “Promontorio bonae spei” (Cape of Good Hope, South Africa).

Range. Western Sahara, SW Morocco (Souss valley).

Extralimital distribution. Widespread in sub-Saharan Africa; SW Arabian Peninsula.

Distribution pattern. Afrotropical (with SW Arabian extension).

Subspecies. The nominate subspecies and *somalica* Parker, 1949 (Somalia, Kenya and Ethiopia).

Genus *Cerastes* Laurenti, 1768

Cerastes cerastes (Linnaeus, 1758)

Coluber Cerastes Linnaeus, 1758

Type locality. “Oriente” [FLOWER (1933) proposed Egypt].

Range. Western Sahara, S Morocco, Algeria, Tunisia, Libya, Egypt, Sinai, SW Israel.

Extralimital distribution. SW Arabian Peninsula (WERNER *et al.* 1999).

Distribution pattern. Palearctic (Saharo-Arabian).

Subspecies. The nominate subspecies in the whole range except for the southwestern corner of the Arabian Peninsula (ssp. *hoofieni* Werner & Sivan, 1999).

***Cerastes gasperettii* Leviton & Anderson, 1967**

C. cerastes gasperettii Leviton & Anderson, 1967

Type locality. Beda Azan, Abu Dhabi (U.A.E.).

Range. Israel (Wadi Arava), S Jordan.

Extralimital distribution. Arabian Peninsula, S Iraq, SW Iran.

Distribution pattern. Palearctic (Arabian).

Subspecies. In the study area the ssp. *mendelssohni* Werner & Sivan, 1999 (Wadi Arava); elsewhere the nominate subspecies.

R e m a r k s . The “*C. cerastes*” records in the map of DISI *et al.* (1988b: 147) are very likely *C. gasperettii*.

***Cerastes vipera* (Linnaeus, 1758)**

Coluber Vipera Linnaeus, 1758

Type locality. “Aegypto” (= Egypt).

Range. Western Sahara, S Morocco, Algeria, Tunisia, Libya, Egypt, N Sinai, SW Israel.

Extralimital distribution. Sahara from Mauritania to Sudan.

Distribution pattern. Palearctic (Saharan).

Subspecies. Monotypic. The validity of the subspecies *chebbiensis* Fourny & Jooris, 1995 is questioned by the authors themselves (JOORIS & FOURNY 1996).

Genus ***Echis*** Merrem, 1820

***Echis coloratus* Günther, 1878**

Type locality. “Jebel Shàrr” (Saudi Arabia).

Range. E Egypt, Sinai, E and S Israel, W Jordan.

Extralimital distribution. Arabian Peninsula. According to BABOCSAY (2004), populations of Oman and U.A.E. belong to the new species *Echis omanensis*.

Distribution pattern. NE Afrotropical and Arabian.

Subspecies. Monotypic. BABOCSAY (2003) described the subspecies *terraesanctae*, from S Israel (Dead Sea basin and Jordan Valley), not surely distinguishable on the basis of the characters set analysed (as stated by the author himself, p. 29).

The *Echis pyramidum* complex

The systematics of this group of species is controversial.

Within the study area the following taxa are quoted for a small number of localities in Morocco, Algeria, Tunisia, Libya and Egypt under the names *arenicola* (Boie, 1827), *carinatus* (Schneider, 1801), *leucogaster* Roman, 1972 and *pyramidum* Geoffroy, 1827. *Echis carinatus* is now considered an extralimital species. McDIARMID *et al.* (1999) demonstrate that *E. arenicola* is a junior synonym of *Scythale pyramidum* from Egypt.

The two specimens from Morocco (BONS & DAKKA 1963 and BONS & GENIEZ 1996) are assigned to *E. leucogaster*, as well as the specimens from Hoggar quoted by ANGEL & LHOTE (1938), those from NE Algeria (BOULENGER 1891; CHIRIO & BLANC 1997) and the one from Tunisia (BOULENGER 1891). Specimens from Libya and Egypt are assigned to *Echis pyramidum*.

These specific identifications seem mostly based on the results of CERLIN (1990), rejected by several authors (see DAVID & INEICH 1999).

***Echis leucogaster* Roman, 1972**

Echis carinatus leucogaster Roman, 1972

Type locality. Boubon, 20 Km of Niamey (Niger), according to ROMAN (1975).

Range. SW Morocco, C Sahara (Hoggar), and possibly NE Algeria and Tunisia.

Extralimital distribution. Sahel (Mauritania S to Nigeria and E to Chad) (see also HUGHES 1988).

Distribution pattern. Afrotropical (Sahelo-Saharan).

R e m a r k s. According to JOGER (1990) *Echis leucogaster* might be conspecific with *E. pyramidum*. SCHLEICH *et al.* (1996) assign the specimens from Morocco, Algeria (including Hoggar), Tunisia and W Libya to *E. arenicola*, considering *E. leucogaster* as subspecies.

Echis pyramidum (Geoffroy St. Hilaire, 1827)

Scythale pyramidum Geoffroy St. Hilaire, 1827

Type locality. Egypt.

Range. Libya, Egypt (and perhaps Tunisia and NE Algeria).

Extralimital distribution. NE Central African Republic, Sudan, Ethiopia, Somalia, N Kenya; S Arabian Peninsula, Iraq, Iran.

Distribution pattern. NE Afrotropical-Arabian-Saharan.

Subspecies. The nominate subspecies in the study area. The subsp. *lucidus* Cerlin, 1990 is a synonym of *pyramidum* (McDIARMID *et al.* 1999).

R e m a r k s. CERLIN (1990) in a revision of the genus, splits *E. pyramidum* in many species or subspecies: *E. p. pyramidum*, *E. p. lucidus*, *E. p. leakeyi* Stemmler & Sochurek, 1969, *E. varius varius* Reuss, 1934, *E. v. darevskyi*, *E. v. borkini*, *E. v. aliaborri* Drewes & Sacherer, 1974, *E. hughesi* and *E. megalcephalus* from N and E Africa, *E. varius borkini* and *E. khosatzkii* from SW Arabian Peninsula. According to McDIARMID *et al.* (1999) most of these forms are synonyms of *E. pyramidum*.

Genus ***Macrovipera*** Reuss, 1927

Macrovipera lebetina (Linnaeus, 1758)

Coluber Lebetinus Linnaeus, 1758

Type locality. "Oriente". MERTENS & MÜLLER (1928) suggested a restriction to "Cypern" (= Cyprus).

Range. S and E Anatolia, E Transcaucasia, Daghestan, Cyprus, Syria, Lebanon, W Jordan, N Israel (extinct); the occurrence in Algeria and Tunisia is doubtful (see remarks).

Extralimital distribution. Iraq, Iran, southern parts of Turkmenistan, Uzbekistan, S Kirghizstan and Tajikistan, Afghanistan, Pakistan, Kashmir.

Distribution pattern. Palaearctic (Turano-Mediterranean).

Subspecies. The nominate subspecies occurs in Cyprus and S Anatolia, in accordance with BILLING & SCHÄTTI (1984); the ssp. *obtusa* Dwigubskij, 1832 in the rest of the range, including *euphratica* Martin, 1838, *turanica* Černov in Tarent'ev & Černov, 1940 and *cernovi* Chikin & Ščerbak, 1992 (perhaps synonym of *peilei* Murray, 1892); the ssp. *transmediterranea* Nilson & Andrén, 1988 for N Africa (see remarks).

R e m a r k s . The occurrence of *M. lebetina* in Northern Africa and therefore the validity of the ssp. *transmediterranea* are questionable, in our opinion, for the following reasons:

a) the localities where the typical specimens come from are old and vague ("Algiers" and "Tunis"), and should be considered doubtful until new living specimens are possibly found;

b) according to HERRMANN *et al.* (1992), *Macrovipera lebetina transmediterranea* is characterized by "ground colour greyish with 31-46 dark grey transverse bands along the back of body, each band two to three scales wide and separated by three scale wide interspaces" (p. 388), whereas *M. mauritanica* has "Groundcolour brownish-greyish with 23-33 dark blackedged windings or blotches along the back of body" and "[...] differs from the other species of *Macrovipera*, except *deserti*, [...], and in having a pronounced undulating zig-zag band along the back" (p. 389). In the original description NILSON & ANDRÉN (1988) place side by side in the picture *M. l. transmediterranea* and *M. deserti* (rather than the nominal sub-species). The *M. l. transmediterranea* type, however, does not seem to have the transversal bands typical of *M. lebetina*, but a zig-zag band often relieved by oval dark patches similar to the ones drawn by KRAMER & SCHNURRENBERGER (1963: p. 548) for *M. m. mauritanica*, and characteristic of this species. The fact of having 25 scales at midbody is not a conclusive element, because *M. mauritanica* has - still according to HERRMANN *et al.* (cit.) - only "[...] normally 27 (scales) at midbody [...]"

Macrovipera mauritanica (Duméril & Bibron, 1848)*Echidna mauritanica* Duméril & Bibron in Guichenot, 1848

Type locality. Restricted to "Oran" (Algeria) according to SCHWARZ (1936).

Range. Morocco, N Algeria, Tunisia, NW Libya. The occurrence in Cyrenaica is erroneous (see remarks).

Distribution pattern. Palearctic (S Mediterranean).

Subspecies. The nominate and *deserti* (Anderson, 1892) (see remarks).

Remarks. SCHLEICH *et al.* (1996: 544) show that the distinctness between *M. mauritanica* and *M. deserti* is very vague, being based on colour pattern only. Moreover, the real distributional ranges of the two forms are still hypothetical (*op. cit.* see fig. 2, p. 545).

However, HERMANN *et al.* (1992) justify the existence of both taxa by means of serological data.

The occurrence in Cyrenaica (i.e. SCHLEICH *et al.* 1996) is referable to RIBOLLA (1923), successively revived by other Italian authors, but the entire paper was considered unreliable by ZAVATTARI (1930: 259).

Macrovipera schweizeri Werner, 1935*Vipera lebetina schweizeri* Werner, 1935

Type locality. "Insel Milos" (Island of Milos, Cyclades, Greece).

Range. Cyclades Archipelago (Siphnos, Kimolos, Polinos, Milos Is.) in the Aegean Sea.

Distribution pattern. Palearctic (Mediterranean, Cycladic endemic).

Subspecies. The nominate subspecies and *siphnensis* Wettstein, 1952 from the island of Siphnos.

Genus ***Pseudocerastes*** Boulenger, 1896***Pseudocerastes persicus*** Duméril, Bibron & Duméril, 1854*Cerastes persicus* Duméril, Bibron & Duméril, 1854

Type locality. "Perse" (= Persia).

Range. Sinai, S Israel, Jordan, Syria.

Extralimital distribution. Arabian Peninsula, Iraq, Iran, Pakistan.

Distribution pattern. Palaearctic (Arabian-Sindian).

Subspecies. The subspecies *fieldi* Schmidt, 1930, which some authors raise at the specific level, occurs in the study area, W Iraq and N Saudi Arabia. The nominate subspecies is found from N Iraq through Iran to Pakistan, with isolated populations in SE Arabian Peninsula.

Genus *Vipera* Laurenti, 1768

The phyletic position of the genus *Vipera* (s.l.) in the subfamily Viperinae has been recently analysed: the combination of both morphological and biochemical data suggests its paraphyly (HERRMANN *et al.* 1999). Up to now, several contributions were aimed at establishing possible arrangements corresponding to monophyletic units. Thus, the species allied to the *lebetina* group have been included in the genus *Macrovipera* (HERRMANN *et al.* 1992).

Moreover, the following subgenera are recognized:

- *Montivipera* (see NILSON *et al.* 1999a), for the species of the *xanthina* group,
- *Pelias* (*sensu* NILSON & ANDRÉN 1997) for the *berus*, *kaznakowi* and *ursinii* groups.
- *Vipera*, for *V. ammodytes* (Linnaeus, 1758), *V. aspis* (Linnaeus, 1758), *V. latasti* Boscá, 1878, *V. monticola* Saint Girons, 1953.

Some authors propose the subgenus *Acridophaga* for the *Vipera ursinii* complex. However, due to the difficulty to assign some species (i.e. *Vipera darevskii*) to *Vipera ursinii* s.l. or to *V. kaznakovi* s.l., a member of the subgenus *Pelias*, the value of *Acridophaga* seems inappropriate at the moment.

The subgeneric position of *V. palaestinae* is quoted as uncertain, being its relationships indefinite among the *xanthina* group, the *lebetina* group and *Daboia* Gray, 1842 (NILSON *et al.* 1999a).

LENK *et al.* (2001), by means of mitochondrial cytochrome *b* and 16S rRNA genes, place the Middle East species of *Macrovipera*

as sister group to the *V. xanthina-raddei* complex, whereas the North African *Macrovipera* appear to be more closely related to *Daboia russelii* (Shaw & Nodder, 1797) and *Vipera palaestinae*. The data presented by LENK *et al.* (*op. cit.*) also support the recognition of *Montivipera* as a full genus.

Considering the highly contradictory results obtained by the different authors in last years, it is here adopted a more conservative view, until these data would be supported by further studies.

***Vipera* (s. 1.) *palaestinae* Werner, 1938**

Type locality. "Haifa, Palaestina" (Israel).

Range. Syria, Lebanon, Israel, W Jordan.

Distribution pattern. Palaearctic (Mediterranean, Levantine endemic).

Subspecies. Monotypic.

Subgenus ***Vipera*** Laurenti, 1768

***Vipera* (*Vipera*) *ammodytes* (Linnaeus, 1758)**

Coluber Ammodytes Linnaeus, 1758

Type locality. "Oriente". SCHWARZ (1936) proposed a restriction to "Zara" (= Zadar, Croatia).

Range. E Alps, Balkans, Aegean Is., N Anatolia (with isolated records in the south), S Georgia (high Kura valley).

Distribution pattern. Palaearctic (NE Mediterranean).

Subspecies. Three to five, depending on the different authors: the nominate (possibly including *gregorwallneri* Sochurek, 1974 and certainly *ruffoi* Bruno, 1968) from NE Italy, Austria, ex Yugoslavia, Albania, SW Romania and NW Bulgaria, *meridionalis* Boulenger, 1903 from S Balkans, Greece including some Cyclades islands and W Turkey, *montandoni* Boulenger, 1904 (possibly a synonym of *meridionalis*) from Romania, N Bulgaria to the Black Sea coast and European Turkey, and *transcaucasiana* Boulenger, 1913, recently treated

as separated species by NILSON *et al.* (1999b), from NE Turkey to Transcaucasia and N Iran.

R e m a r k s . Data from Syria and Armenia are wrong: the first one is due to a typing mistake, Syria instead of Syra (Greek Is.) and the second one due to doubtful identification (DAVID & INEICH 1999).

***Vipera (Vipera) aspis* (Linnaeus, 1758)**

Coluber Aspis Linnaeus, 1758

Type locality. "Gallia". SCHWARZ (1936) proposed a restriction to "Poitou [Frankreich]" (= Poitou, France).

Range. Pyrenees, France, Switzerland, Italy (including Sicily, Elba Is. and Montecristo Is.).

Distribution pattern. Palaearctic (S European).

Subspecies. ZUFFI (2002) proposed to raise at specific rank the taxa *atra* Meisner, 1820, *hugyi* Schinz, 1834 (not 1833) and *zinnikeri* Kramer, 1958, but this change has been argued (e.g. FILIPPI 2003). CONELLI *et al.* (2004) and GOLAY *et al.* (2004) place in synonymy *atra* with *aspis*, on the basis of molecular and morphological data. The subspecies still valid should be the nominate from the NE Spain, central and S France, NW Italy, W and S Switzerland and extreme SW Germany, *hugyi* from S Italy, Sicily and Montecristo Is. (Tuscan archipelago, introduced), *zinnikeri* from the Pyrenees Mts., and *francisciredi* Laurenti, 1768 from N and central Italy (including Elba Is.).

***Vipera (Vipera) latastei* Boscá, 1878**

Type locality. "Ciudad Real" emended to "Valencia, Spanien" (Valencia, Spain) by MERTENS & MÜLLER (1928: 52).

Range. Iberian Peninsula, Morocco (Rif Mts. and Middle Atlas), C and E coastal Algeria; not known with certainty in Tunisia.

Distribution pattern. Palaearctic (W Mediterranean).

Subspecies. The nominate one (from most of the Iberian Peninsula) and *gaditana* Saint Girons, 1977 (SW Iberian Peninsula and N African range).

Vipera (Vipera) monticola Saint Girons, 1954*Vipera latastei monticola* St. Girons, 1954

Type locality. "Haut-Atlas, Massif du Toubkal, Maroc" (Toubkal Massif, High Atlas Mts., Morocco).

Range. Morocco (Atlas Mts.).

Distribution pattern. Palearctic (Mediterranean, Atlas Mts. endemic).

Subspecies. Monotypic.

R e m a r k s . Closely related to *V. latastei*, of which could be a subspecies due to the occurrence of specimens from the Middle Atlas with intermediate characters (BONS & GENIEZ 1996).

Subgenus ***Montivipera*** Nilson, Tuniyev, Andrén,
Orlov, Joger & Herrmann, 1999

Some authors (e.g. NILSON & ANDRÉN) consider the geographically isolated populations of the *V. xanthina* complex as full species, while others (SCHÄTTI *et al.* 1991) recognise only *V. xanthina*, *V. raddei* and possibly *V. wagneri*. The specific distinctness of *V. bornmuelleri* Werner, 1898 and *V. wagneri* Nilson & Andrén, 1984 is based only on electrophoretic studies (JOGER & MEDER 1997).

Vipera (Montivipera) bornmuelleri Werner, 1898

Type locality. "Libanon" restricted by WERNER (1922). Proposed as "Bcharré, Lebanon" by MERTENS (1967).

Range. Mt. Lebanon range and Mt. Hermon.

Distribution pattern. Palearctic (Mediterranean, Levantine endemic).

R e m a r k s . Considered conspecific of *V. xanthina* by SCHÄTTI *et al.* (1991).

Vipera (Montivipera) raddei Boettger, 1890

Type locality. "Kasikoparan, in Armenien" now Kazikkiran, Tuzluca (Kars prov., Turkey) according to NILSON & ANDRÉN (1986).

Range. Extreme E Anatolia, Armenia, Azerbaijan.

Extralimital distribution. NW Iran.

Distribution pattern. Palaearctic (SW Asiatic, Armenian endemic).

Subspecies. In addition to the nominate subspecies (E Anatolia, Armenia and NW Iran), was described the ssp. *kurdistanica* Nilson & Andrén, 1986 (near the Urmia Lake, NW Iran, and perhaps the extreme SE regions of Anatolia), quoted later as full species by NILSON *et al.* (1999a).

R e m a r k s . The group of *V. raddei* includes also two other taxa from N Iran: *V. albicornuta* Nilson & Andrén, 1985 and *V. latifii* Mertens, Darevsky & Klemmer, 1967, both considered by SCHÄTTI *et al.* (1991) only as isolated populations of *V. raddei*. Their specific validity, on the contrary, would be supported by biochemical data according to HERRMANN *et al.* (1987).

***Vipera (Montivipera) wagneri* Nilson & Andrén, 1984**

Type locality. Vicinity of Lake Urmia (Armenian-Persian border), Azerbaijan province, NW Iran.

Range. Extreme E Anatolia.

Extralimital distribution. NW Iran.

Distribution pattern. Palaearctic (SW Asiatic, Armenian endemic).

Subspecies. Monotypic.

R e m a r k s . According to JOGER *et al.* (1988), this species is the closest relative of *V. xanthina* (Gray, 1849).

***Vipera (Montivipera) xanthina* (Gray, 1849)**

Daboia Xanthina Gray, 1849

Type locality. "Xanthus" [SW Turkey (Kinik)] and "Asia Minor", restricted to Xanthos (Kinik) (Muğla prov., Turkey) by NILSON & ANDRÉN (1986).

Range. Thrace, E Aegean Is., C and W Anatolia. Endemic.

Distribution pattern. Palaearctic (NE Mediterranean).

Subspecies. None, being synonyms the taxa *bulgardaghica* Nilson & Andrén, 1985 from Bolkar Mts. and *albizona* Nilson, Andrén & Flardh, 1990 from Kulmac Mts., considered indistinguishable from *xanthina* on the basis of electrophoretic studies (JÖGER & MEDER 1997).

Subgenus *Pelias* Merrem, 1820

A number of species and subspecies have been so far described, with doubtful relationships among them. According to JÖGER *et al.* (2003), this subgenus is made up of two lineages, the *V. berus* complex and the *V. ursinii-kaznakowi* complex, both of them consisting of several species groups.

The *Vipera (Pelias) berus* complex

This complex includes *Vipera seoanei* Lataste, 1879 and a group of taxa closely related to *V. berus*, and whose systematic allocation is still far from being clear.

According to JÖGER *et al.* (1997), the complex of *V. berus* includes two semispecies: *V. (b.) berus* (with three subspecies: the nominate, *nikolskii* Vedmederya, Grubandt & Rudaeva, 1986 and *sachalinensis* Carevskij, 1917), and *V. (b.) bosniensis* Boettger, 1889 (with two subspecies: the nominate and *barani* Böhme & Jöger, 1983). Afterwards, JÖGER *et al.* (2003) identify five groups: 1) alpine *V. b. berus*, 2) all remaining *V. b. berus* including *sakhalinensis* and most of “*V. nikolskii*”, 3) geographically isolated *V. nikolskii* from S Russia; 4) *V. berus bosniensis* from Balkans; 5) *V. barani* (including *V. pontica*) from N Turkey.

We provisionally prefer to list the three species usually recognised by recent authors: *V. berus*, *V. nikolskii* and *V. barani*.

Vipera (Pelias) barani Böhme & Jöger, 1983

Type locality. Ca. 60 Km N of Adapazari, Turkey.

Range. N Anatolia.

Distribution pattern. Pontic endemic.

R e m a r k s . JOGER *et al.* (2003) put into synonymy *Vipera pontica* Billing, Nilson & Sattler 1990 with *V. barani*, on the basis of morphological and molecular data.

***Vipera (Peliias) berus* (Linnaeus, 1758)**

Coluber Berus Linnaeus, 1758

Type locality “Europa” restricted to “Upsala, Schweden” (Upssala, Sweden) by MERTENS & MÜLLER (1940).

Range. Most of Europe (excluding Iberian, Italian and southern most Balkan peninsulas, and Ciscaucasia).

Extralimital distribution. Throughout Siberia (N to the Arctic Circle, 70° N) to Sakhalin Id. and N Korea on the Pacific coast.

Distribution pattern. Palaearctic (Siberian-European).

Subspecies. The nominate subspecies from most of the European range, Russia, Kazakhstan, N Nei Mongol and N China, *bosniensis* Boettger, 1889 from S Slovenia to Macedonia and N Albania, perhaps also S Hungary and Bulgaria, and the extralimital *sakhalinensis* Carewsky, 1916 from SE Siberia, Sakhalin Is. and N Korea, all treated either as subspecies or full species.

***Vipera (Peliias) nikolskii* Vedmederja, Grubandt & Rudaeva, 1986**

Type locality. Banks of Uda river, betw. Besljudovka and Vasishtshevo, near Kharkov (Ukraine), according to GOLAY *et al.* (1993).

Range. SE Ukraine and S Russia.

Distribution pattern. Palaearctic (E European).

R e m a r k s . According to MILTO & ZINENKO (2003) there is evidence of genetic hybridation and introgression between *nikolski* and *berus* in natural populations. A wide area of intergradation is located in the eastern part of the Russian pain.

Vipera (Pelias) seoanei Lataste, 1879

Type locality. "In montibus Gallaecorum et Cantabrorum ... d'Espagne" (Galician and Cantabrian Mts., Spain). MERTENS & MÜLLER (1928) restricted to "Cabañas, prov. Coruña, Spanien" [Cabanas near Ferrol, Coruna prov., according to GOLAY *et al.* (1993)].

Range. N Iberian Peninsula and SW France.

Distribution pattern. Palearctic (W European, Cantabrian endemic).

Subspecies. The nominate from N Portugal, NW and N Spain and SW France, and *cantabrica* Braña & Bas, 1983 from Cantabrian Mts. and surrounding areas.

The *Vipera (Pelias) ursinii-kaznakovi* complex

A plethora of taxa, considered by different authors as species, subspecies or synonyms, has been described or resurrected in recent years; most of these taxa are based on small differences in scalation or pattern, so that their validity is still debated.

NILSON & ANDRÉN (2001) revise the systematics of the *Vipera ursinii* complex, based on the analysis of morphological variation as well as protein electrophoretic and immunological distances; according to the authors, the morphological differences between the various forms discussed here are very subtle, and specimens without locality information may be difficult to classify. Within the *Vipera ursinii* complex the authors recognise two main groups, the European (5 taxa) and the Asiatic (8 taxa); most of the taxa were regarded as species in accordance with the phylogenetic species concept.

JÖGER *et al.* (2003) identify five "evolutionary groups (species)" within the *V. kaznakovi-ursinii* complex: 1) *ursinii* including all European subspecies, 2) *renardi* including *eriwanensis* and Central Asian "*ursinii*", 3) *anatolica*, 4) *darevskii*, 5) *kaznakovi* with *dinniki* and *orlovi*. Until further studies confirm such hypothesis, we adopt this point of view.

***Vipera (Peliias) anatolica* Eiselt & Baran, 1970**

Type locality. Çiglikara Ormani, 50 km SSW of Elmalı, Turkey.

Range. Kohu Mts., SW Turkey.

Distribution pattern. Palaearctic (Taurian endemic).

***Vipera (Peliias) darevskii* Vedmederja, Orlov & Tuniyev, 1986**

Type locality. Mount Legli, Mokrye mountains, Gukasyanskii region, Armenia.

Range. N Armenia (E Dzavachet Mts.) and probably adjacent areas in Georgia.

Distribution pattern. Palaearctic (Armenian endemic).

R e m a r k s . Species of doubtful validity; according to ORLOV & TUNIYEV (1990), this relict taxon is a valid species, probably originated by hybridisation between *V. kaznakovi* and *V. ursinii eriwanensis*.

***Vipera (Peliias) kaznakovi* Nikolsky, 1909**

Type locality. Tsebel'da, Sukhumi District, according to English translation. Tsebelda, the vicinity of Sukhumi (east coast of Black Sea) according to ORLOV & TUNIYEV (1990).

Range. Caucasus and W Transcaucasia (Abkhasia, W Georgia and extreme NE Anatolia).

Distribution pattern. Palaearctic (Colchic endemic).

Subspecies. The nominate and *dinniki* Nikolsky, 1913, replacing the nominate form at higher elevations of the Great Caucasus (described from "Upper reaches of the Malaya Laba 8000 ft a.s.l. ... and ... Svanetia 7000 ft a.s.l.").

R e m a r k s . Some populations of *V. kaznakovi* from the Krasnodarskii Region of Russia, on the northeastern shore of the Black Sea, have been described by TUNIYEV & OSTROVSKIKH (2001) as *Vipera orlovi* and *V. magnifica*; they differ from *V. kaznakovi* in a number of scalation and head pigmentation characters and whose status seems uncertain.

Vipera (Pelias) renardi (Christoph, 1861)

Pelias renardi Christoph, 1861

Type locality. Tawrow in Don and Tambow in the steppes (Russia).

Range. Ukraine and S Russia; Armenia and E Turkey.

Extralimital distribution. Steppes of Kazakhstan, E to the Mongolian Altaj and mountains of former Sovietic Central Asian republics (*V. renardi parursinii* and *V. r. tienshanica*, recently described by NILSON & ANDRÉN, 2001); Elburs and Lenkoran Mts. in N Iran and SE Azerbaijan (*V. r. ebneri* Knoepfner & Sochurek, 1955).

Distribution pattern. Palearctic (endemic).

Subspecies. The nominate in steppes of Ukraina and Russia; *V. r. eriwanensis* from Little Caucasus in Armenia and NE Turkey; *V. r. lotievi* Nilson, Tuniyev, Orlov, Höggren & Andrén, 1995 from Great Caucasus (Russia, Georgia, Azerbaijan).

Vipera (Pelias) ursinii (Bonaparte, 1835)

Pelias Ursinii Bonaparte, 1835

Type locality. "... monti dell'Abruzzo prossimi alla provincia d'Ascoli..." (mountains of Abruzzi, near Ascoli province, Italy).

Range. Isolated populations in SW France, C Italy, E Austria (extinct), Hungary, former Yugoslavia, Albania, Greece, Bulgaria, Romania and Moldova.

Distribution pattern. Palearctic (S and E European).

Subspecies. Within the study area are described: *graeca* Nilson & Andrén, 1988 from Pindos Mts. in Greece, *macrops* Mehely, 1911 from mountains of Bosnia-Herzegovina, Macedonia, Montenegro, N Albania, and perhaps Krk Is., *moldavica* Nilson, Andrén & Joger, 1993 from Moldova and Danube Delta in Romania (perhaps also in Bulgaria), *rakosiensis* Mehely, 1894 from Hungary (extinct in Austria and W Romania), *ursinii* (including *wettsteini* Knoepfner & Sochurek, 1955) from SW France and C Italy.

Genus *Gloydius* Hoge & Romano-Hoge, 1981

The genus *Gloydius* has been proposed as a new generic name for the Old-World species of the genus *Agkistrodon* Palisot de Beauvois, 1799.

Gloydius halys (Pallas, 1776)

Coluber halys Pallas, 1776

Type locality. "Salt Lake near the Lugaskoi Sawod [factory] on the Upper Yenisey" (Siberia, Russia), according to GLOYD & CONANT (1990). Redefined as "Naryn or Ryn Peski (desert), near the Russia-Kazakhstan border" by BOUR (1993).

Range. SE Azerbaijan (Lenkoran).

Extralimital distribution. From the northern side of the Caspian Sea and N Iran eastwards through North Turan, N China, Mongolia, NE Manchuria to SE Russia.

Distribution pattern. Palaearctic (Centralasiatic).

Subspecies. The nominate subspecies from E Kazakhstan, NW China, Mongolia, NE Manchuria and SE Russia, *caraganus* (Eichwald, 1831) from North Turan between the Volga River delta and the border Kazakhstan-China, *caucasicus* (Nikolsky, 1916) from N Iran, S Turkmenistan (Kopet Dag) and NW Afghanistan. Three isolated subspecies are *G. h. stejnegeri* (Rendahl, 1933) from Shanxi (NE China), *G. h. cognatus* Gloyd, 1977 from Gansu and Qinghai (Central China) and *G. h. bohemei* Nilson, 1983 from NE Afghanistan (ORLOV & BARABANOV 1999).

KEY TO THE FAMILIES OF SNAKES

- 1 Worm-like (Fig. 1); dorsal and ventral scales not differenti-
ated; eye concealed by a semitransparent shield and looks
like a dark spot, sometimes not clearly visible in preserved
specimens 2
- 1' Ventral scales wider than long, very differentiated from all
other scales (Figs. 5-6); eye more or less developed, never
covered by scales 3
- 2 Tail length not exceeding its width (Fig. 4); supralabials
present (the ocular scale doesn't reach the mouth) (Figs.
2-3) Typhlopidae
- 2' Tail length much longer than its width; supralabials absent
(the ocular scale reaches the mouth) Leptotyphlopidae
- 3 Widened ventral scales covering the central part of the
belly only, the remaining belly surface covered with small
and not differentiated scales as the dorsum; stout bodied,
with blunt tail (Fig. 5) Boidae
- 3' Ventrals wide, almost entirely covering the surface of belly
(Fig. 6) 4
- 4 Head covered above by large symmetrical shields (2 pari-
etals, 2 supraoculars, 1 frontal, 2-4 prefrontals, 2 internasals),
much larger than dorsal scales, not separated by smaller
scales; pupil round or vertical (Figs. 7-b); anal plate entire
or divided 5
- 4' Head mostly covered by small scales; pupil vertical; body
scales always keeled; anal plate undivided (Fig. 8) . . . Viperidae
- 5 Loreal present (Fig. 7); usually no grooved poisonous fangs;
if present, just in front of the eye or rear . Colubridae (*partim*)
- 5' Loreal absent (Fig. 9) 6
- 6 Small size (usually less than 50 cm); 15 scales at midbody;
nostril in a single nasal (Fig. 10); dorsum or head often
with evident colour pattern 8
- 6' Large size; not less than 19 scales at midbody; nostril
between two nasal scales or in one nasal divided in the
lower half 7

- 7 Shape of the snout more or less rounded; eyes normal in size; fixed poisonous fangs in the anterior part of the upper jaw; nostril between two nasal scales (Fig. 9). Elapidae

- 7' Shape of the snout pointed; eyes very small, erectile poisonous fangs at middle of upper jaw; nostril in one nasal divided in the lower half only (Fig. 11).
 Atractaspididae (*Atractaspis*)

- 8 Preocular absent (the eye is separated from the nasal scale by the suture between the 3rd supralabial and the prefrontal) (Fig. 20); poisonous fangs under the eye; body pattern with black and light transversal bands
 Atractaspididae (*Micrelaps*)

- 8' Preocular present (Fig. 7); poisonous fangs absent; body pattern variable. Colubridae (*partim*)

KEY TO THE SPECIES OF THE FAMILY LEPTOTYPHLOPIDAE

A single genus in the study area: *Leptotyphlops*

- 1 10 rows of scales at mid tail 2
- 1' 12 rows of scales at mid tail *4

- 2 Snout more or less hooked (preoral portion of rostral concave), clearly projecting beyond mouth. 3
- 2' Snout rounded, more slightly projecting beyond mouth (Fig. 14) *L. cairi*

- 3 Snout slightly hooked in lateral view (Fig. 12) *L. macrorhynchus*
- 3' Snout hawkbill-like in lateral view (Fig. 13). *L. algeriensis*

- 4 Prefrontal narrower than frontal (Fig. 15) **L. nursii*
- 4' Prefrontal clearly larger than frontal (Fig. 16) **L. burii*

* Note: These species have extralimital distribution, but their presence in the key is linked to the discovery of a specimen from W Egypt in the Museum “La Specola”, Florence, identified as *L. burii* x *nursii*.

KEY TO THE SPECIES OF THE FAMILY TYPHLOPIDAE

- 1 Tip of snout clearly pointed in profile; eyes hidden (Fig. 2); tip of tail without apical spine **Rhinotyphlops*
- 1' Snout rounded in profile; eyes visible (Fig. 3); tip of tail with a spiny scale (Fig. 4) 2
- 2 Ocular plate entire; (20) 22-24 (26) scales at midbody *Typhlops vermicularis*
- 2' Ocular plate divided (the eye is below the suture of two plates); 20 scales at midbody *Ramphotyphlops braminus*

* Note: the distinction between *Rhinotyphlops simoni* and *R. episcopus* is based on internal organ topography. It is therefore impossible to distinguish the two species on the basis of external characters.

KEY TO THE SPECIES OF THE FAMILY BOIDAE

- 1 Tail conical, pointed, ends in a conical scale; 11-15 scales between eyes (Fig. 19); head covered with very small scales *Gongylophis colubrinus*
- 1' Tail obtuse; 4-9 scales between eyes (Fig. 18) 2
- 2 2 (3) post-internasal shields; 4-7 scales between eyes; 2-3 scales between nasals and the eye *Eryx jaculus*
- 2' 3-4 post-internasal shields; 7-9 scales between eyes; 4-5 scales between nasals and the eye *Eryx miliaris*

KEY TO THE GENERA OF THE FAMILY COLUBRIDAE

- 1 Prefrontal scales fragmented in many small scales (Fig. 17), as the loreal; eye separated from the supralabials by 1-2 series of small suboculars (Fig. 18) *Spalerosophis*
- 1' 2 prefrontals entire; eyes in contact with at least 1 supralabial (except for most of *Hemorrhois hippocrepis*) (Fig. 7a) 2
- 2 Rostral scale very large, clearly projecting over the snout, concave below (Fig. 22); nostril oblique; 19 scale rows at

- midbody; 1-2 preoculars, 8 supralabials, the 4th and/or the 5th in contact with eye; elliptical vertical pupil; TL < 50 cm *Lytorhynchus*
- 2' Rostral scale not projecting over the snout 3
- 3 Pupils vertical, sometimes cat-like (Fig. 23)..... 4
- 3' Pupils round, if oval never slit-shaped 6
- 4 Dorsals keeled; loreal absent (Fig. 23); 21-27 scale rows at midbody *Dasypeltis*
- 4' Dorsals smooth; loreal present 5
- 5 17-21 scale rows at midbody; head oval, usually well distinct from neck (Fig. 24) *Telescopus*
- 5' 25 or more scale rows at midbody; head elongated with light stripes more or less evident (Fig. 25); in the study area only known in SW-Morocco *Lamprophis*
- 6 Canthus rostralis angular (Fig. 61); projecting supraocular forming a sort of "eyebrow"; frontal narrow and deep set between supraoculars (Fig. 26-27); scale smooth in 17 rows at midbody; 159-176 ventrals, 48-73 subcaudals; opisthoglyphous, with grooved rear fangs below the posterior border of the eye after 10-17 maxillary teeth *Malpolon*
- 6' Canthus rostralis not angular, supraoculars not forming an eyebrow; head not clearly convex between supraoculars ... 7
- 7 The largest supralabial (usually the 6th) in contact or very close to the parietal (Fig. 28); 7-9 supralabials, 19-25 smooth dorsal scales at midbody, 1-2 postoculars; TL < 60 cm..... *Macroprotodon*
- 7' No supralabial in contact or very close to the parietal 8
- 8 Loreal clearly longer than broad; frontal narrow and rather elongate; 17 (rarely 15 or 19) smooth scales at midbody; 1-2 larger, fang-like maxillary teeth below the anterior border of eye, preceding 10-13 smaller maxillary teeth (Figs. 29-30)..... *Psammophis*
- 8' Not as above; rear fangs absent 9

- 9 Dorsal scales more or less clearly keeled; 19 or more scales at midbody 10
- 9' Dorsal scales smooth or only slightly keeled 11
- 10 Keels on dorsals more or less evident; (23) 25 (27) scale rows at midbody; 4 longitudinal stripes on back or large and irregular dark spots. *Elaphe* s.l. (*partim*)
- 10' Dorsal scales always strongly keeled; 19-21 (23) scale rows at midbody; pattern different from above. *Natrix*
- 11 Nostril in a single nasal scale (Fig. 10); 7 supralabials; 17 or less scale rows at midbody (Anatolia and Middle East) 12
- 11' Nostril between 2 nasal scales (Fig. 7); usually 8 or more supralabials (7 only in few species); dorsal scales in 17 or more rows at midbody. *Coronella*, *Coluber* s.l. and *Elaphe* s.l. *
- 12 Rostral large, wedged between the internasals, well visible from above (Fig. 32); head black above with characteristic pattern; 15 scale rows at midbody; TL < 40 cm
. *Rhynchocalamus*
- 12' Rostral not particularly large, not wedged between the internasals (Fig. 33); head and neck with variable pattern; 15-17 scale rows at midbody *Eirenis*

* Note: *Coluber* s.l. includes *Coluber* s.str., *Hemorrhois*, *Hierophis* and *Platyceps*, while *Elaphe* s.l. includes *Elaphe* s.str., *Rhinechis* and *Zamenis*)

KEY TO THE GENERA *COLUBER* S.L., *CORONELLA* AND *ELAPHE* S.L.

- 1 17 or 19 scale rows at midbody 2
- 1' More than 19 scale rows at midbody. 16
- 2 17 scale rows at midbody 3
- 2' 19 scale rows at midbody 4
- 3 Pattern with black crossbars on light ground colour; Sinai and NW Arabian Peninsula. *Coluber* (s.l.) *sinai*
- 3' Colour pattern different; Cyprus only *Hierophis cypriensis*

- 4 Colour pattern with black crossbars on light ground colour (Fig. 34) *Platyceps elegantissimus*
- 4' Not as above 5
- 5 Neck with a couple of blackish spots or a dark collar; rest of body rather uniform; dorsal scales with a single apical pit 6
- 5' Different pattern 7
- 6 A dark, white bordered collar on neck (Fig. 37); anterior and posterior border of eye dark (Fig. 35); anterior spots of neck smaller than the distance separating from each other *Platyceps collaris*
- 6' 2 dark, white bordered spots on sides of neck (ssp. *dahli*) or joined to form a collar (ssp. *najadum*); eyes anteriorly, posteriorly and below white bordered (Fig. 36); anterior spots larger, or equal, than the distance separating from each other (Fig. 38) *Platyceps najadum*
- 7 7 (rarely 8) supralabials, 3rd and 4th touching the eye; small size (< 60 cm); a dark band starting from the nostril and, crossing the eye, reaching at least the sides of neck; often a dark mark on head; no small pre-subocular between the preocular and the supralabials; Europe, Caucasus and Anatolia *Coronella austriaca*
- 7' 8 or more supralabials; different pattern 8
- 8 8 supralabials 9
- 8' 9 or more supralabials *Platyceps* (partim) 14
- 9 Greenish-yellow ground colour, largely obscured by black or dark green indistinct crossbars on foreparts; rest of the body with yellowish streaks; in S Italy, NE Italy and NW Balkans entirely black; ventrals 180-230; W Europe eastward to N Dalmatia; also on Gyaros Is.. . *Hierophis viridiflavus*
- 9' Colour different, except melanic forms; Istria, Balkans, Anatolia and Middle East 10
- 10 Ventrals 167 to 186; pattern with dark blotches and often small light spots and streaks on foreparts; dorsals always

- narrowly pale edged; no melanic populations known; Balkans, Euboea and Crete *Hierophis gemonensis*
- 10' More than 185 ventrals; pattern different; dorsals usually not narrowly pale edged; melanism in adults frequent; large size, up to 250 cm; Balkans eastwards to Middle East . 11
- 11 Dorsum black 12
- 11' Dorsum not black 13
- 12 Upper side of head clouded or spotted; ventrum orange to brick-red (yellow to ochraceous in preserved specimens); black blotches from throat to subcaudal region; Rhodes Isl. *Coluber* (s.l.) *caspius* p.p.
- 12' Upper side of head uniformly black *Coluber* (s.l.) *jugularis*
- 13 Dorsum greyish brown to olivaceous (greyish brown in preserved specimens); broad light longitudinal streak on dorsal scales; ventrum white to yellow, unspotted
. *Coluber* (s.l.) *caspius* p.p.
- 13' Dorsum orange to bright brick red (light brown to reddish brown in preserved specimens); light streak on dorsal scales faint or absent; ventrum yellow to orange (ochraceous in preserved specimens), unspotted *Coluber* (s.l.) *schmidtii*
- 14 Less than 208 ventrals; ventrals + subcaudals less than 310; two supralabials in contact with orbit (Fig. 42); color pattern generally of transverse blotches or bars; often a dark longitudinal nuchal stripe (Fig. 43)
. *Platycephalus rogersi/ventromaculatus*
- 14' More than 208 ventrals; ventrals + subcaudals more than 315 (*Platycephalus rhodorachis* complex) 15
- 15 238-264 ventrals; 134-149 subcaudals; 374-405 ventrals + subcaudals *Platycephalus saharicus*
- 15' 220-232 ventrals; 124-133 subcaudals; 351-365 ventrals + subcaudals *Platycephalus* sp.
- 16 1 preocular scale only, no pre-subocular (Fig. 7) 17

- 16' At least 1 small pre-subocular present (Fig. 45) 23
- 17 Head with one dark band across the forehead joining the eyes, another one extending backwards from the eyes to the sides of neck (Fig. 39); belly chequered or striped; 21 (23) scale rows at midbody, usually 8 supralabials; < 200 ventrals. *Coronella girondica*
- 17' Head and belly pattern different; usually 23 or more scale rows at midbody (rarely 21, in the *Zamenis longissimus* complex). 18
- 18 Rostral shield clearly pointed behind (Fig. 41); pattern of adults made of 2 well defined longitudinal dark stripes on back; young boldly marked with "H" shaped blotches on back, which may join to form a "ladder-like" design; (25) 27 (29) scale rows at midbody; 201-220 ventrals; Iberian Peninsula and S France. *Rhinechis scalaris*
- 18' Rostral shield not pointed behind; pattern different (if similar, the stripes are 4, weakly distinct from ground colour) . 19
- 19 Ventrals more or less evidently keeled (angulated) on each side (Fig. 40); adults uniformly coloured, grey-brown, greenish or blackish, or 4 longitudinal dark stripes not well defined; young darkly spotted, with two light blotches at the base of neck, which can continue alongside of body; (21) 23 scales at midbody . . . (*Zamenis longissimus* complex) 20
- 19' Ventrals not keeled; dorsal pattern consisting in reddish or brown black bordered blotches (sometimes joined to form longitudinal lines). 22
- 20 Ventrals weakly keeled; adults normally melanic without light dots; young light bellied, with the dorsal pattern consisting in two dorso-lateral bands or closely spaced vertical spots (about 120) on body; iris golden, reddish-brown or reddish-orange; SE Azerbaijan only *Zamenis persicus*
- 20' Ventrals strongly keeled. 21
- 21 Adults usually uniformly coloured, grey-brown, greenish or blackish, often with small white dots; light nuchal blotches present, except for melanistic specimens; belly yellowish; iris ochre in life *Zamenis longissimus*

- 21' Adults often with 4 longitudinal dark stripes not well defined; nuchal blotches never present; belly greyish; iris orange to red in life; S Italy and Sicily only . . *Zamenis lineatus*
- 22 23 (25) scale rows at midbody, 203-230 ventrals; dorsal spots ochre or light brown with black border, arranged in two rows separated by a vertebral light line (ssp. *hohenackeri*) or in one row formed by the lateral spots joined together (ssp. *taurica*); iris ochre in life . . . *Zamenis hohenackeri*
- 22' (25) 27 (29) scale rows at midbody, 220-260 ventrals; dorsal spots orange to brown, black bordered, or two dorsal longitudinal stripes with black border at least on inner margin; iris red in life *Zamenis situla*
- 23 Frontal shield about as long as broad, with lateral borders straight (Fig. 46) 24
- 23' Frontal shield longer than broad, with lateral borders curved (Fig. 7b) 26
- 24 Adult large sized, usually light to chestnut brown with 4 dark stripes along body (disappearing towards the tail); (23) 25 (27) scale rows at midbody. Juveniles with a row of dark, often black-edged, broad spots or bars on back and 1-2 series of smaller spots on flanks; head boldly marked; belly with dark markings that may form two streaks. Peninsular Italy, S Balkans, Euboea, Peloponnesus and some Aegean islands *Elaphe quatuorlineata*
- 24' Different pattern (except for juveniles of *E. sauromates*) and range (note that ranges of *E. quatuorlineata* and *E. sauromates* are parapatric in SW Bulgaria and NE Greece). 25
- 25 Anterior angle of the parietal shield elongated and touching or nearly touching the lower postocular shield (Fig. 47); yellowish or brown ground colour with dark brown spots, usually with black borders and partially fused transversally; head of adults uniform dark above; belly yellowish, sometimes with dark spots on outer edges of the ventrals; ventrals keeled on the sides; (23) 25 (27) scale rows at midbody; E Balkans and European Turkey eastward to Aral lake *Elaphe sauromates*

- 25' Anterior angle of the parietal shield elongated and usually touching only the upper postocular shield (Fig. 46); head with a clear pattern of longitudinal and transverse blotches, black bordered; belly grey or reddish, with numerous dark spots; 23 (25) scale rows at midbody; from Crimea, E Anatolia and E Caucasus to the Pacific coasts *Elaphe dione*
- 26 Two preoculars present, in addition to pre-subocular(s); two supralabials in contact with the eye (Fig. 48); dorsal scales obtusely or faintly keeled 27
- 26' Preocular single; no or one supralabial in contact with the eye (Fig. 45); dorsal scales smooth 28
- 27 21 scale rows at midbody; 74-99 subcaudals in males, 70-94 in females; dorsal spots usually joined to form a zig-zag pattern, otherwise they are never roundish *Hemorrhois ravergeri*
- 27' 23 scale rows at midbody; 82-107 subcaudals in males, 82-107 in females; dorsal spots usually separated and roundish or rhombic in shape. *Hemorrhois nummifer*
- 28 192-214 ventrals in males, 204-228 in females; 21-23 scale rows at midbody; head pattern consists of symmetrical markings; upper part of head and forebody usually with narrow, transverse dark bands (Fig. 44); these bands become incomplete on the neck and split up into six or more longitudinal series of blotches, which decrease in size towards midbody; the last fourth is usually uniform. In the area considered only in Egypt (not Sinai) . *Platycephalus florulentus*
- 28' More than 215 ventrals in males, 224-241 in females; N Africa 29
- 29 (25) 27-29 dorsal scales at midbody; usually 1 series of small suboculars separating the eyes from the supralabials (Fig. 49); characteristic horse-shoe marking on head; dorsal colour with large dark polygonal spots on light ground colour; these spots often have darker border; Maghreb.
 *Hemorrhois hippocrepis*
- 29' 23-25 dorsal scales at midbody; usually 1 supralabial in contact with the eye at least on one side of head (Fig. 45); dorsal colour with widely separated spots; head pattern

- can start from the rostral, with light spots), the 2nd covers the parietal shields, the 3rd band, across the neck and often with light margin, long and well visible from ventral side (sometimes joined to form a collar) (Fig. 53); dorsal scales often with very small dark dots at tip; S Anatolia to Israel and Jordan *E. rothi*
- 7 Evident dark collar on neck (Figs. 33, 58) 8
- 7' Collar absent or barely distinct from ground colour 10
- 8 Body pattern formed by irregular brown spots arranged in 4 rows (Fig. 58); ventral parts dotted; TL < 35 cm; from SE Anatolia to Israel *E. lineomaculatus*
- 8' Head with more or less distinct dark markings; body colour usually uniform; when spots are present, they consist of 1-2 series of dark blotches; ventral parts without dots (Fig. 33). (**E. modestus* complex) 9
- 9 3 dark bands on head and neck with regular borders; the band across parietals reaching the supralabials (no temporal dot); scales of forepart of trunk with darker centre; posterior inframaxillaria mostly in contact; S Anatolia and extreme N Syria *E. barani*
- 9' Dark bands on head with highly irregular borders, but sometimes the dark markings reduced or disappearing (especially *E. aurolineatus* and *E. levantinus*); dorsal scales with lighter centre; Caucasus, Anatolia to Jordan
. *E. modestus* (including *E. aurolineatus* and *E. levantinus*)
- 10 Uniformly light brown coloured (juveniles might be spotted); SE Anatolia (Fig. 69) *E. thospitis hakkariensis*
- 10' Usually with a more or less distinct pattern (striped or spotted). 11
- 11 Ventral parts brown or grey-brown; dorsal pattern with 4 longitudinal more or less evident stripes, sometimes with additional stripes on sides (in certain specimens the stripes are not visible); dorsal scales with medial light stripe; SE Anatolia to Israel and Jordan (Fig. 70). *E. decemlineatus*
- 11' Ventral parts grey-green or brown-grey; dorsal pattern with irregular dark spots on forebody tending to join in longitu-

dinal stripes on hindbody (ssp. *punctatolineatus*) (Fig. 57); some specimens have black dorsal parts with many small light dots (ssp. *kumerloevi*); E Anatolia *E. punctatolineatus*

* Note: species and subspecies referable to the *Eirenis modestus* complex are not distinguishable on the basis of external characters or the respective ranges, but through their head pattern. *E. modestus*: interocular and parietal band scythe like; sometimes the parietal band is joined to the interocular in the median line; eastern Aegean Is., Turkish Thrace, Anatolia (except for the south-east), Transcaucasia. *E. aurolineatus*: head pattern usually incomplete or vanishing; evident temporal and parietal points; large oval gular spots; southern slopes of Bolkar Mts.

E. levantinus: distinct from *E. barani* for the lack of dorsal scales with dark centre and for the head pattern (parietal band limited to the parietal scales, a temporal dot present)

Apart from possible considerations on the validity of these taxa and their possible relationships, we suggest both to read the original descriptions and to make reference to the plates at page 92 of the article by SCHMIDTLER (1993) for potential identification.

GENUS *LAMPROPHIS*

Only one species: *Lamprophis fuliginosus*.

KEY TO THE GENUS *LYTORHYNCHUS*

- 1 Body and tail with well defined transverse black bands (23-27 on trunk, 8 on tail) (Fig. 59) *L. kennedyi*
- 1' Dorsal pattern made of brown to blackish ovoid spots; every inner scale of these spots usually having light centre (30-55 spots on trunk, 9-13 on tail) (Fig. 60) *L. diadema*

GENUS *MACROPROTODON*

Only one species: *Macroprotodon cucullatus*.

Note: see WADE (2001) for an identification key to the different subspecies or forms of *Macroprotodon cucullatus*.

KEY TO THE GENUS *MALPOLON*

- 1 2 loreals (Fig. 61), frontal narrower than the supraoculars (Fig 26); 17-19 scale rows at midbody *M. monspessulanus*
- 1' 1 loreal (Fig. 62), frontal as wide as the supraoculars (Fig. 27); 17 scale rows at midbody *M. moilensis*

KEY TO THE GENUS *NATRIX*

- 1 1 (2) preocular, 3 (1-5) postoculars, 7 (5-8) supralabials (3rd and 4th entering the eye) (Fig. 73); 19 scale rows at midbody; sides of neck often with light (yellowish, orange or white) and/or dark spots; body without zig-zag mediodorsal longitudinal band and (nearly always) without lateral dark spots with light centre *N. natrix*
- 1' 2 (1-3) preoculars, 2-3 (1-6) postoculars, 7-8 (3-10) supralabials; 19-21 scale rows at midbody; dark and light nuchal collar absent 2
- 2 2 postoculars (rarely 1 or 3), 7 supralabials (3rd and 4th entering the eye) (Fig. 71); (19) 21 (23) scale rows at midbody; zig-zag longitudinal dark band often present and frequently lateral dark spots with light centre; W Mediterranean countries (east to N Apennine) *N. maura*
- 2' 3-4 (5-6) postoculars, 8 supralabials (4th and 5th usually entering the eye) (Fig. 72); 19 (21) scale rows at midbody; zig-zag dark band usually absent, lateral spots usually without light centre and arranged in 3 series; Italy, Balkans, Anatolia, Caucasus, Middle East, Egypt (Nile Delta) *N. tessellata*

KEY TO THE GENUS *PSAMMOPHIS*

- 1 15 series of scales at midbody; usually 3 supralabials in contact with eye; in the area quoted once in SW Libya *P. tanganicus*
- 1' 17-19 series of scales at midbody; 2-3 supralabials in contact with eye 2
- 2 Usually 3 supralabials enter the eye; well defined longitu-

- dinal markings on top of the head; less than 116 subcaudals; S Transcaucasia only. *P. lineolatus*
- 2' Usually 2 supralabials enter the eye; at least in Asia, markings on top of head broken up into smaller blotches or spots, and subcaudals more than 117. 3
- 3 A narrow dark band across the eye; (8) 9 (10) supralabials (usually 5th and 6th enter the eye) (Fig. 30) 4
- 3' Dark band across the eye absent, substituted by a large dark spot on sides of head, followed by some others on the neck (Fig. 31); a narrow light stripe (sometimes interrupted) on midline of trunk, a large dark band on the first 3 series of scales; belly yellowish; (7) 8 (9) supralabials (4th and 5th enter the eye). *P. sibilans*
- 4 Belly with a dark medial band and two dark lines broken on the outer sides by the ventrals; head sides with a dark stripe, with spots also on lips; 17 (19) scale rows at midbody *P. schokari*
- 4' Belly whitish, without the large medial band and the lateral broken lines; body sand coloured, head with weak traces of markings above, but with dark stripes on sides from snout backwards across the eyes; (17) 19 scale rows at midbody *P. aegyptius*

GENUS *RHYNCHOCALAMUS*

Only one species: *Rhynchocalamus melanocephalus*.

KEY TO THE GENUS *SPALEROSOPHIS*

- 1 Dorsal spots roundish or oval, with regular (or scarcely irregular) margins; widest dorsal spots including at least 40 scales (Fig. 68); 31-33 scale rows at midbody; Maghreb countries *S. dolichospilus*
- 1' Dorsal spots with strongly irregular margins; wider spots including at most 35 scales (Fig. 63); 25-33 scale rows at midbody (maximum 31 in the study area) *S. diadema*

KEY TO THE GENUS *TELESCOPUS*

- 1 Loreal in contact with the eye (Fig. 65). (*T. fallax* complex) 2
- 1' Loreal in contact with a preocular (Fig. 64).
- (*T. dhara* complex) 4
- 2 Head pattern dark, clearly distinct from ground colour of
body 3
- 2' Head pattern not as above; large dorsal spots along body
irregularly bordered (Fig. 67); 186-222 ventrals; (7) 8 (9)
supralabials; extreme NE Italy (Istria) eastward to Anato-
lia, Transcaucasia and Middle East. *T. fallax*
- 3 Belly black; head black to dark grey with black and light
grey mottles (Fig. 66); 172-196 ventrals; 39-58 subcaudals;
15-29 crossbars; Syria, E Lebanon and Jordan *T. nigriceps*
- 3' Belly grey, with densely spread fine black spots, lighter lat-
erally and darker medially; head grey, vermiculated with
black; neck dorsally black; body colour light grey-brown,
with narrow dorsal spots, either vanishing or forming
transverse bars; 206-214 ventrals; 49-64 subcaudals; 28-47
crossbars; Jordan, Sinai and Negev desert in Israel
- *T. hoogstraali*
- 4 More than 235 ventrals 5
- 4' Less than 230 ventrals; 55-79 subcaudals; anal divided; 1
preocular; nasal divided; 2-3 postoculars; 8-9 supralabi-
als; 11-14 infralabials, the first three in contact with the
chin shields; 21 scale rows at midbody; S Tunisia and NW
Libya *T. tripolitanus*
- 5 Middle East to Sinai; anal entire; belly white, sometimes
with indefinite marks; 1 preocular, 2 postoculars, 9 (10)
supralabials, nasal divided below; 19-21 scales at midbody;
235-274 ventrals; 66-72 subcaudals; yellow-reddish or sand-
brown colour, often with indistinct pattern *T. dhara*
- 5' North Africa; anal divided; 1 (2) preocular, mostly in con-
tact with the frontal; 2 (4) postoculars; 9-11 supralabials;
nasal divided; 21 (23) scales at midbody; 241-272 ventrals;
70-86 subcaudals *T. obtusus*

KEY TO THE SPECIES OF THE FAMILY ATRACTASPIDIDAE

- 1 Dorsal pattern uniformly dark; 25-29 scale rows at midbody
..... *Atractaspis engaddensis*
- 1' Dorsal pattern made by dark and whitish rings, the dark
rings larger; belly and upper part of head dark (Fig. 74);
15 scale rows at midbody *Micrelaps muelleri*

KEY TO THE SPECIES OF THE FAMILY ELAPIDAE

- 1 Anal plate divided, posterior dorsal scales clearly keeled;
colour uniformly blackish *Walterinnesia aegyptia*
- 1' Anal plate single, dorsal scales all smooth 2
- 2 1 row of suboculars separating the supralabials from the
eye; 1 preocular; 21 scale rows at midbody *N. haje*
- 2' Supralabials entering the eye; 2 or more preoculars; 1-3
dark crossbars on throat; 25 scale rows at midbody .. *N. nubiae*

KEY TO THE GENERA OF THE FAMILY VIPERIDAE

- 1 Loreal pit present (Fig. 75)..... *Gloydius*
- 1' Loreal pit absent 2
- 2 Subcaudal scales in a single row..... *Echis*
- 2' Subcaudal scales in two rows 3
- 3 "Horns", formed by several small scales, present upon the
eyes (Fig. 76) *Pseudocerastes*
- 3' "Horns" absent or formed by a single pointed scale 4
- 4 Lateral scales smaller than dorsal and turned obliquely
downwards (Fig. 78); "horns" formed by a single scale pre-
sent or absent (Fig. 79) *Cerastes*
- 4' Lateral scales similar to the dorsal and not turned obli-
quely downwards; hornless 5
- 5 Nostrils on the upper part of snout (well visible from
dorsal view); SW Morocco (Fig. 77)..... *Bitis*

- 5' Nostrils on sides of snout 6
- 6 Head covered only with small scales (also the supraoculars are fragmented) (Fig. 80)..... *Macrovipera*
- 6' At least one pair of enlarged scales (supraoculars) on head (Fig. 82) *Vipera*

GENUS *BITIS*

Only one species: *Bitis arietans*.

KEY TO THE GENUS *CERASTES*

- 1 Eyes on the upper part of head; average size 35 cm (max 50), less than 120 ventrals *C. vipera*
- 1' Eyes lateral; average size 50-60 cm, sometimes > 80 cm; more than 130 ventrals 2
- 2 Ventrals less than 147 in males, less than 152 in females; at least 1 pair of enlarged tubercles in the occipital area on medial line, just before the eyes; 3 dark spots above the maxilla; Sahara, Sinai and Israel..... *C. cerastes*
- 2' Ventrals more than 147 in males, more than 152 in females; no enlarged tubercles in the occipital area; dark spots on upper maxilla absent; Israel (Wadi Arava) and Jordan
..... *C. gasperettii*

KEY TO THE GENUS *ECHIS*

- 1 3-4 scale rows separating the eye from supralabials (Fig. 88); the head, viewed from above, widening from the eyes to neck; E Egypt and Middle East *E. coloratus*
- 1' 2 scale rows separating the eye from supralabials (rarely 1 or 3) (Fig. 87); the head, viewed from above, ovoid, slightly widening from eyes to neck; N Africa.....
..... (*E. pyramidum* complex) 2

- 2 Nasal divided; belly white with black spots *E. pyramidum*
- 2' Nasal entire; belly white *E. leucogaster*

GENUS *GLOYDIUS*

Only one species: *Gloydius halys*.

KEY TO THE GENUS *MACROVIPERA*

- 1 23 (rarely 21 or 25) scale rows at midbody; Cyclades Archipelago only *M. schweizeri*
- 1' 25 or more scale rows at midbody (rarely 23); N Africa and Middle East 2
- 2 Dorsal pattern formed by a zig-zag stripe darker than the ground colour, continuous or more or less broken: in this case there can be seen roundish or oval spots ("typical" *mauritanica*), quadrangular or polygonal spots ("*deserti*" pattern); usually 27 scales at midbody; NW Africa
. *M. mauritanica*
- 2' Dorsal pattern formed by two series of transverse alternate dark bars, but often joined forming a zigzag band; 25-27 scale rows at midbody; Middle East *M. lebetina*

GENUS *PSEUDOCERASTES*

Only one species: *Pseudocerastes persicus*.

KEY TO THE GENUS *VIPERA*

- 1 Some larger scales on the upper part of head; usually 2 parietals, 1 frontal and 2 supraoculars more or less recognisable (Fig. 81) 2
- 1' Head scales small, usually the inner ones keeled and smaller than the dorsal 9
- 2 Nostril close to the lower edge of a rather large nasal shield 3
- 2' Nostril in the centre of the nasal (Fig. 83) 6

- 3 Head clearly distinct from the body; tip of snout slightly bent onwards; parietals and frontal are variably fragmented 4
- 3' Head moderately distinct from the body; snout obtuse; usually parietals and frontal entire (absent from Iberian Peninsula and Anatolia) *V. berus*
- 4 N Iberian Peninsula; 1 subocular row; 24-32 subcaudals; 8-39 intercanthals + intersupraoculars *V. seoanei*
- 4' Different distribution 5
- 5 N Anatolia; 1-2 subocular rows; 30-37 subcaudals; 24-45 intercanthals + intersupraoculars *V. barani*
- 5' SE Ukraine and S Russia; melanic; usually less than 20 intercanthals + intersupraoculars *V. nikolskyi*
- 6 1 apical scale touching the rostral shield; head covered only by large shields (Fig. 81); usually less than 13 intercanthals + intersupraoculars; upper preocular in contact with the nasal (Fig. 83); upper side of the nasorostral shield straight; no yellow-orange or red colours in pattern of live specimens (absent from Great Caucasus and Black Sea coastal areas) *V. ursinii* s.l.
- 6' 2 apical scales touching the rostral shield; upper side of the nasorostral shield obtusely bent; yellow, orange, or red in pattern (Great Caucasus, Black Sea coastal areas and N Armenia) 7
- 7 Head wide, clearly distinct from the body, its width equal to the distance from the tip of the snout to the angle of the mouth; dark or black ground color with a yellow to red pattern that persists in upper or lower labials in melanistic specimens (Fig. 89) *V. k. kaznakovi*
- 7' Head narrow, barely distinct from the body, its width less than the distance from the tip of the snout to the angle of the mouth; dorsal pattern different 8
- 8 Head flat or convex above; nostril in the centre of the nasal shield; frontal shield equal to or smaller than the parietal shield; upper preocular shield usually separated from rostral shield (Great Caucasus) *V. kaznakovi dinniki*

- 8' Head slightly concave from above; nostril in the lower part of the nasal shield; frontal shield larger than the parietal shield; upper preocular shield usually touching the rostral shield (N Armenia) *V. darevskii*
- 9 Tip of snout with a more or less evident horn formed by several small scales. 10
- 9' No horn on tip of snout, which can be prominent upwards. 11
- 10 Rostral scale reaching the horn, which is usually made of less than 9 scales; 21-23 scale rows at midbody; Iberian Peninsula and Maghreb only *V. latastei*
- 10' Rostral scale scarcely reaching the horn, which is usually made of 9-20 scales; 21 (23) scales at midbody; NE Alps, Balkans, Greece, Anatolia and Transcaucasia *V. ammodytes*
- 11 19 (rarely 21) scale rows at midbody; High Atlas only *V. monticola*
- 11' 21 scale rows at midbody or more 12
- 12 21 (23) scale rows at midbody; tip of snout moderately directed upwards; from NE Spain to the Alps, Italy (including Sicily) *V. aspis*
- 12' (21) 23 (25) scale rows at midbody; tip of snout blunt. . . . 13
- 13 Characteristic head pattern: upper part with a dark "V" on light ground colour that almost reaches the snout tip from the sides of neck; a dark stripe and a brief vertical stripe start from the eye, the first reaching the posterior border of mouth, the second reaching the upper jaw in the middle (Fig. 84); (24) 25 scales at midbody; Syria; Lebanon, Israel and Jordan *V. palaestinae*
- 13' Different pattern 14
- 14 Supraocular separated from the eye by a series of granular scales; extreme E Anatolia (Fig. 90) *V. raddei*
- 14' Supraocular not separated from the eye. 15
- 15 High altitudes of Lebanon Mts. and Mt. Hermon; less than 153 ventrals; 21-23 scale rows at midbody *V. bornmuelleri*

- 15' Different distribution; usually more than 23 scale rows at midbody 16
- 16 E Anatolia; 10 supralabials; 161-168 ventrals; 23 scale rows at midbody (Fig. 90) *V. wagneri*
- 16' W to Central Anatolia; 9 supralabials; 143-167 ventrals; (21) 23 (25) scale rows at midbody (Fig. 85) *V. xanthina*

CORRECTION TO THE KEY TO THE SPECIES OF THE FAMILY TESTUDINIDAE

A banal mistake remained in the key published in the first part of this work (SINDACO 1998); we take the occasion for correcting it.

On pag. 118, the items must be so modified:

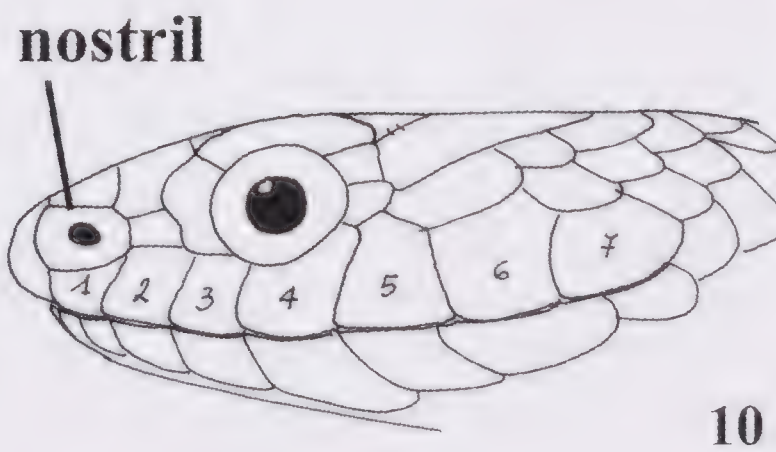
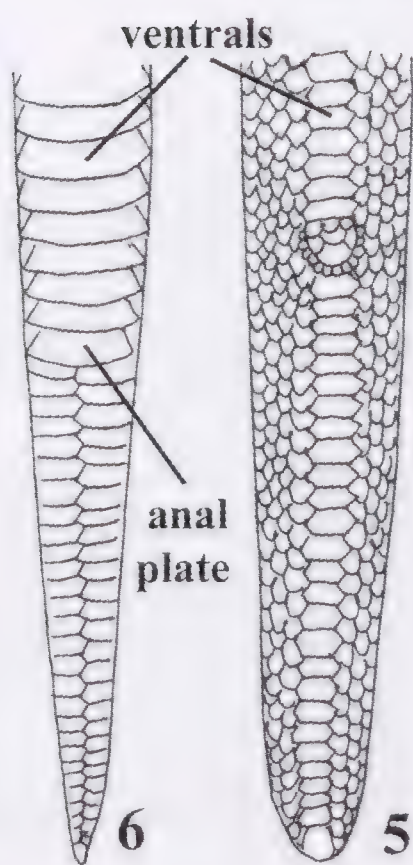
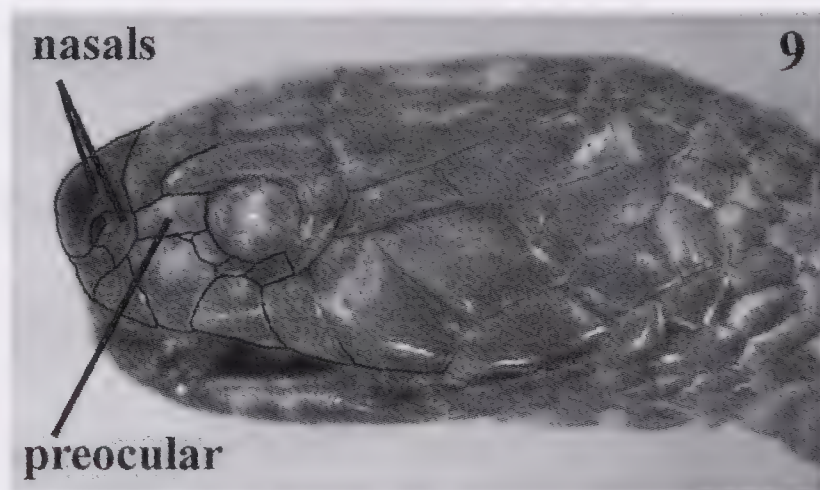
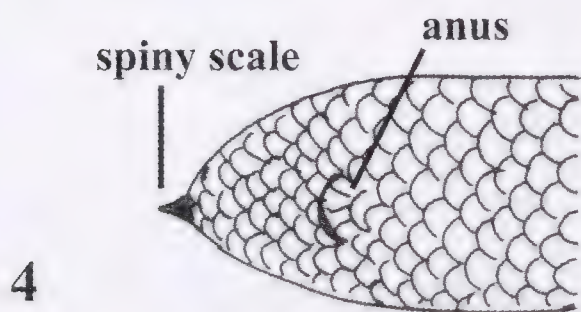
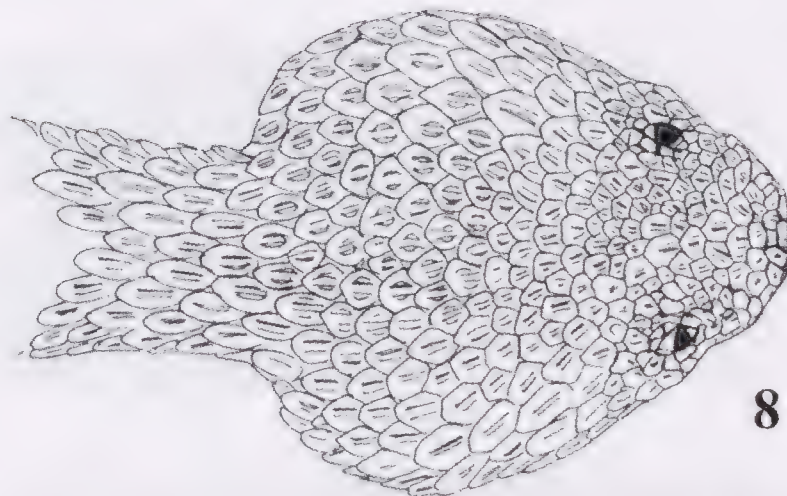
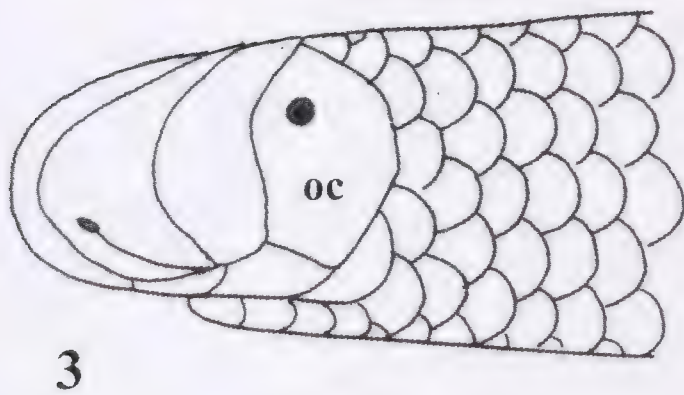
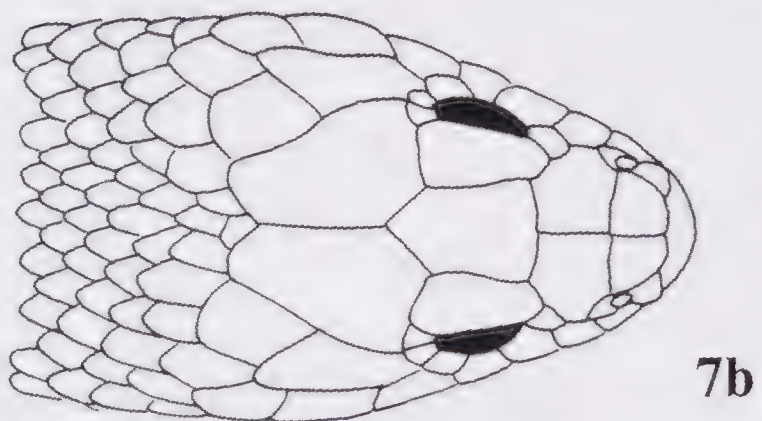
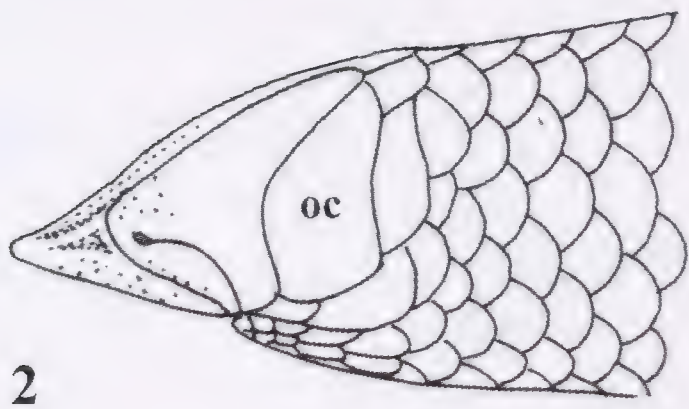
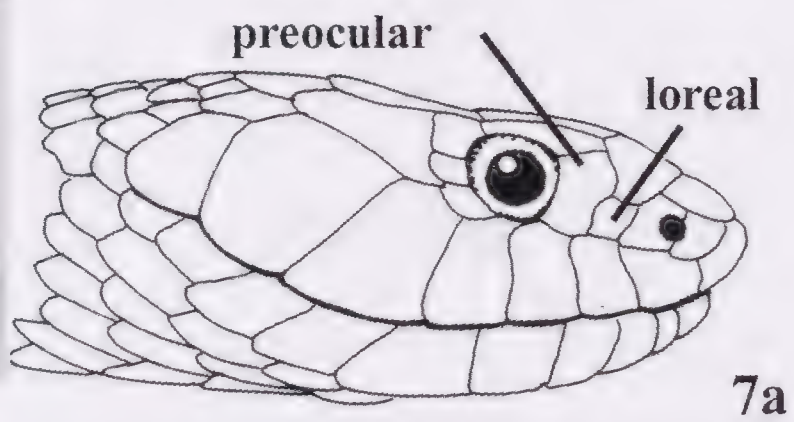
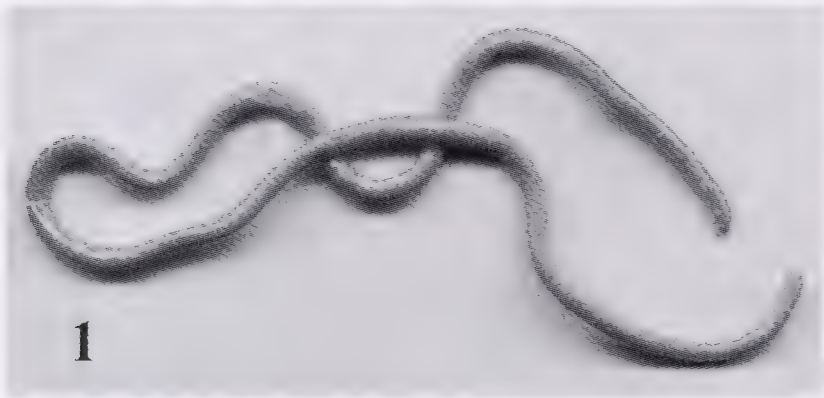
- 1 Supracaudal scale usually divided; tail tipped with a corneous case; 5-10 longitudinal rows of scales on anterior surface of foreleg; hindside of thigh without large conical tubercle; (Table I/6). *Testudo hermanni*
- 1' Supracaudal scale usually single; tail tipped or not with a horny scale; 3-6 longitudinal rows of scales on the foreside of foreleg; a large conical tubercle on the thigh present or absent; (Table I/7) 2

ACKNOWLEDGEMENTS

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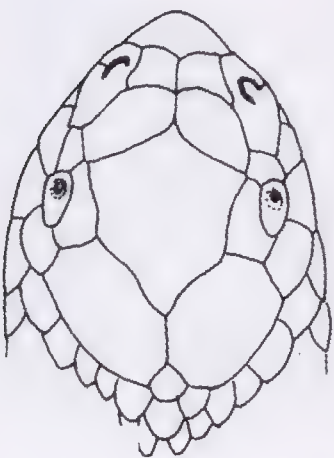
Figs. 1-10

1. *Leptotyphlops macrorhynchus*. Example of "worm like" snake.
2. *Rhinotyphlops simoni*, side view of head (oc = ocular plate).
3. *Typhlops vermicularis*, side view of head (oc = ocular plate).
4. *Typhlops vermicularis*, cloacal and tail apical region with indication of the spiny scale.
5. Boidae, ventral view of ventral scales, cloacal region and tail.
6. Colubridae, ventral view of ventral scales, cloacal region and tail.
- 7a Colubridae, lateral view of head.
- 7b Colubridae, dorsal view of head.
8. Viperidae, dorsal view of head.
9. Elapidae, lateral view of head.
10. Colubridae, lateral view of head with indication of nostril in one single nasal scale. Number (1 to 7) indicate the supralabial scales.

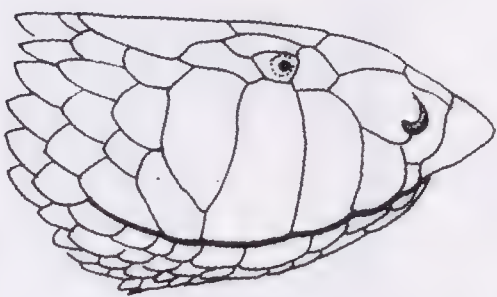


Figs. 11-21

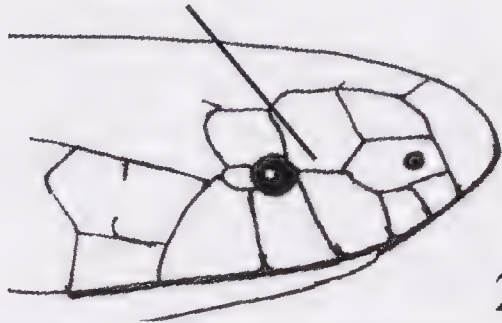
11. *Atractaspis engaddensis*, lateral and dorsal views of head (redrawn from HAAS 1950).
12. *Leptotyphlops macrorhynchus*, lateral view of head.
13. *Leptotyphlops algeriensis*, lateral view of head.
14. *Leptotyphlops cairi*, lateral view of head.
15. *Leptotyphlops nursii*, dorsal view of head (pf = prefrontal scale, f = frontal scale) (redrawn from GASPERETTI 1988).
16. *Leptotyphlops burii*, dorsal view of head (pf = prefrontal scale, f = frontal scale) (redrawn from GASPERETTI 1988).
17. *Spalerosophis diadema*, dorsal view of head evidencing the 4 prefrontal scales.
18. *Eryx jaculus*, dorsal view of forehead, evidencing the nasals, the nostril, the eye, the scales between the nasal and the eye, and the scales between the eyes.
19. *Gongylophis colubrinus*, dorsal view of forehead, evidencing the nostril, the eye, and the scales between the eyes.
20. *Micrelaps muelleri*, lateral view of head.
21. *Spalerosophis diadema*, lateral view of head evidencing the series of subocular scales.



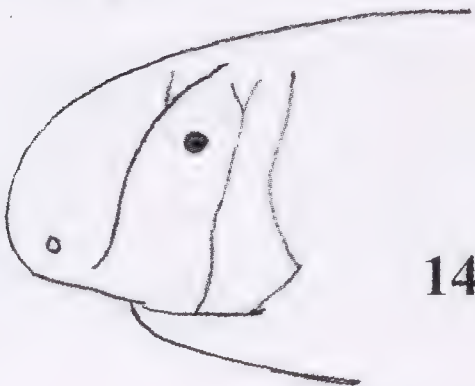
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suture



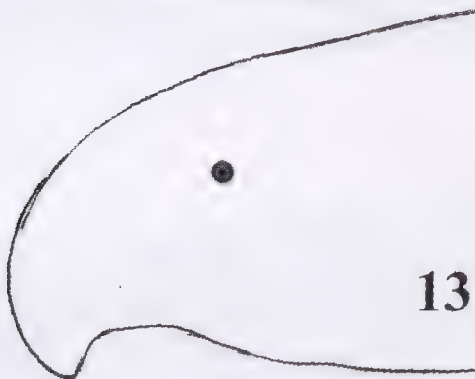
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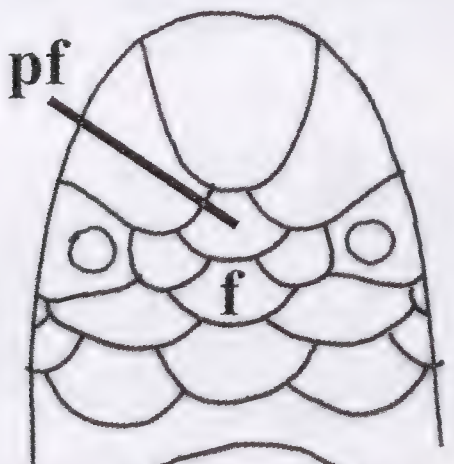
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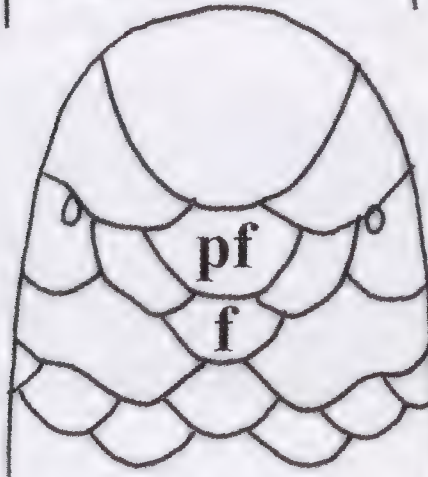
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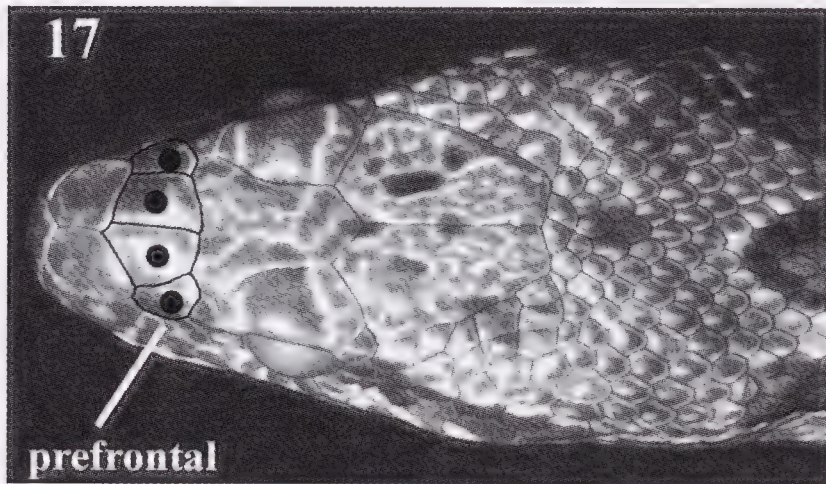
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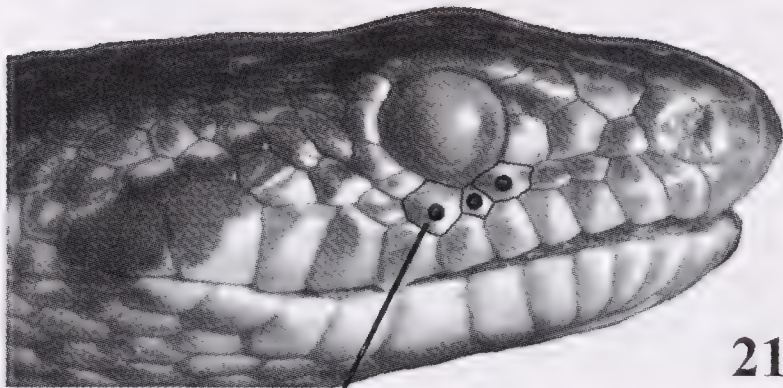


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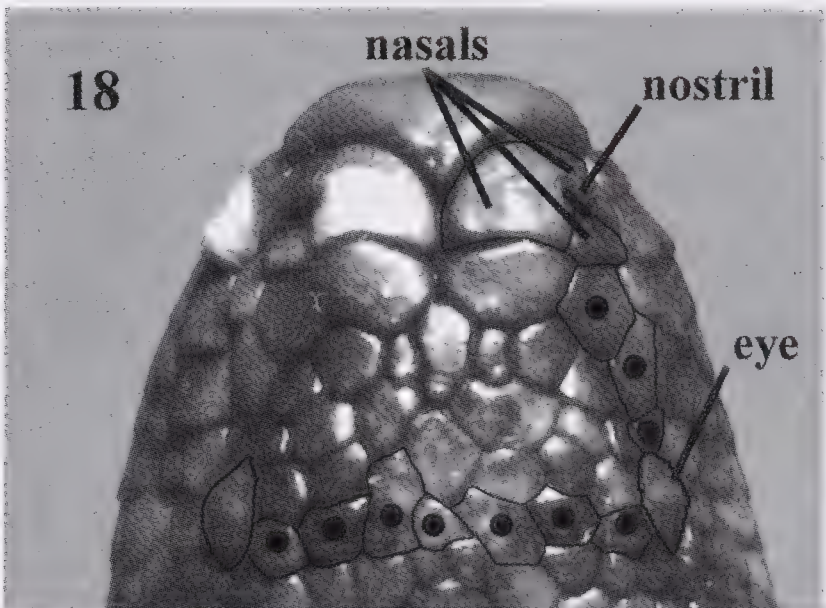
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prefrontal



21

suboculars

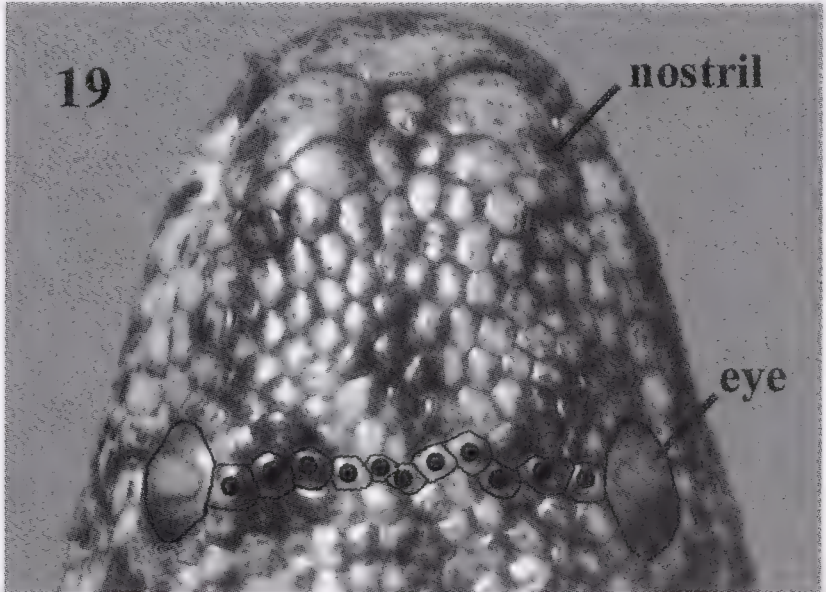


18

nasals

nostril

eye



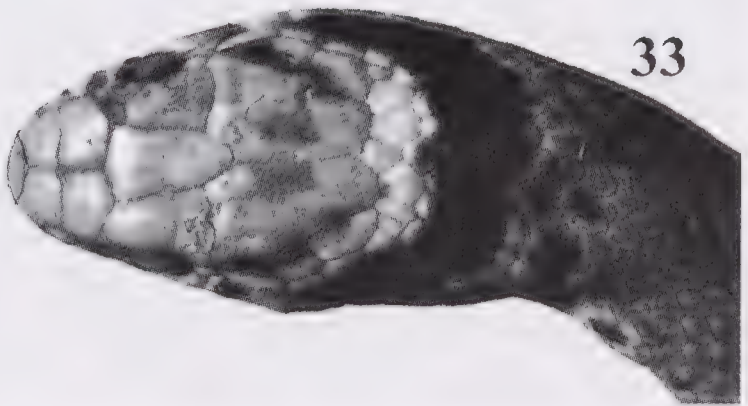
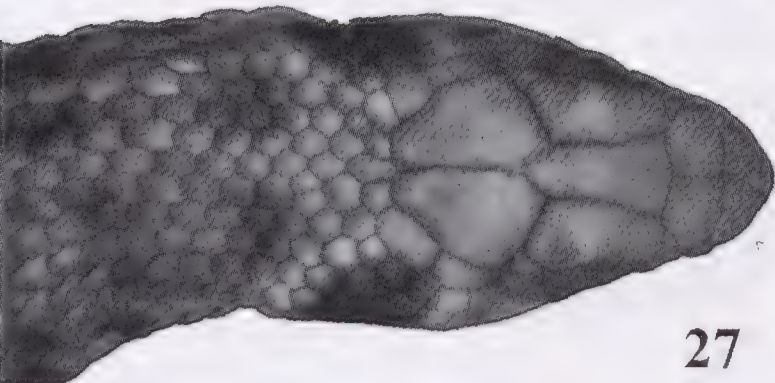
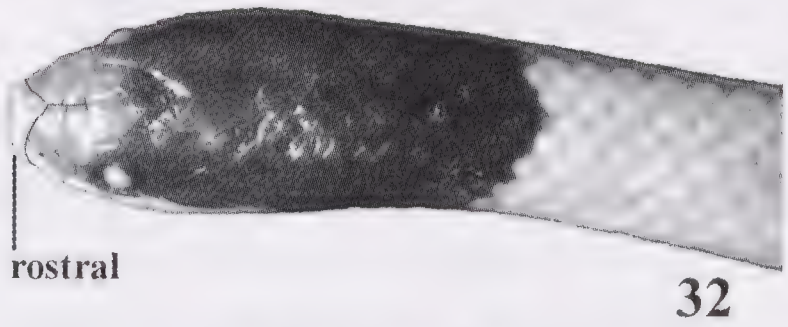
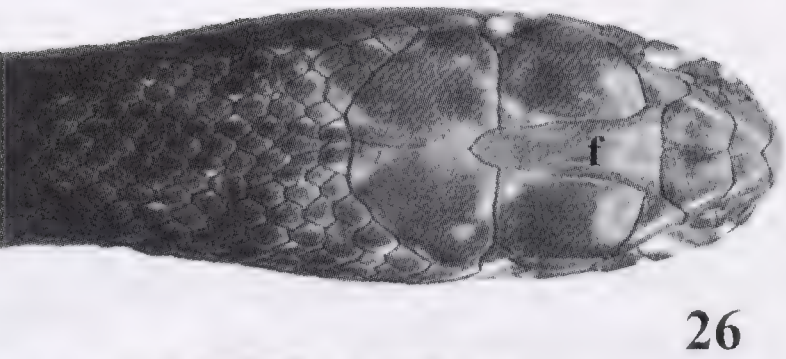
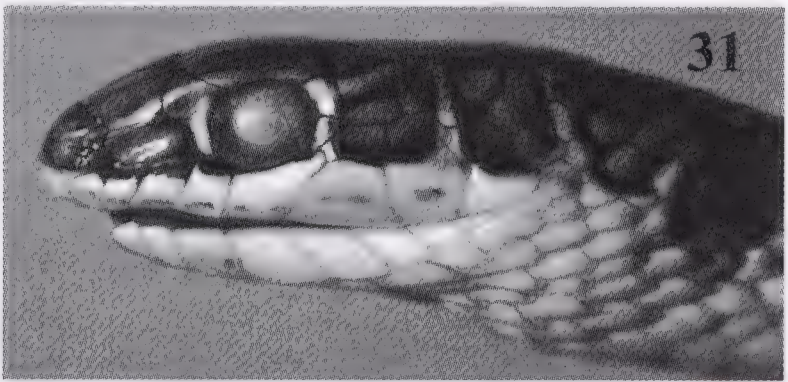
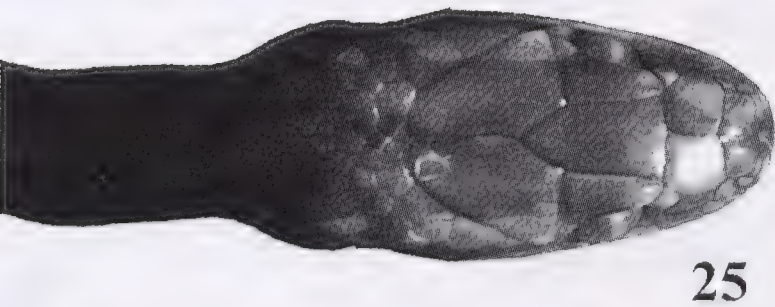
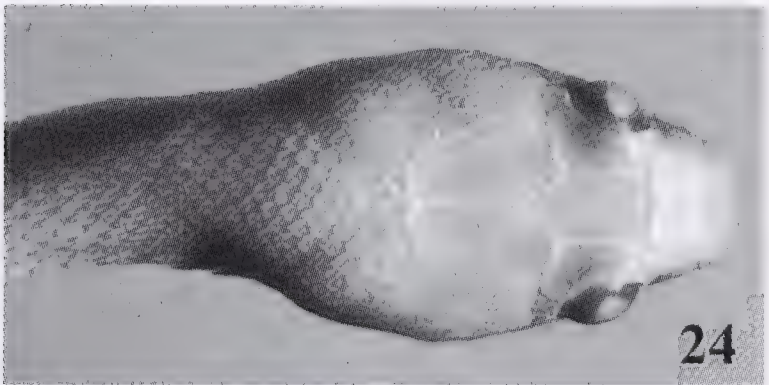
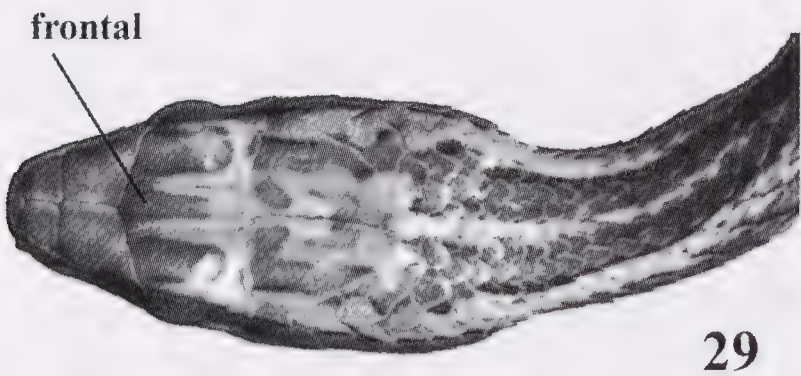
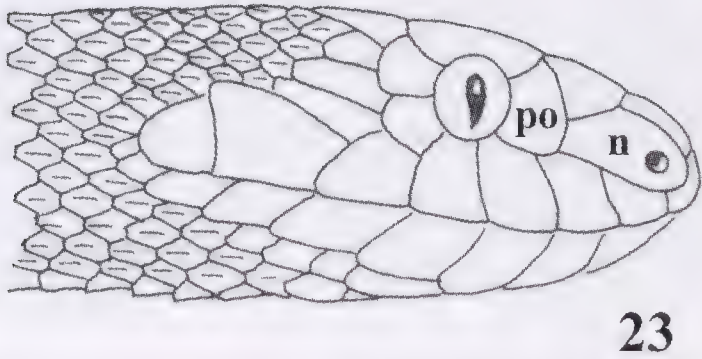
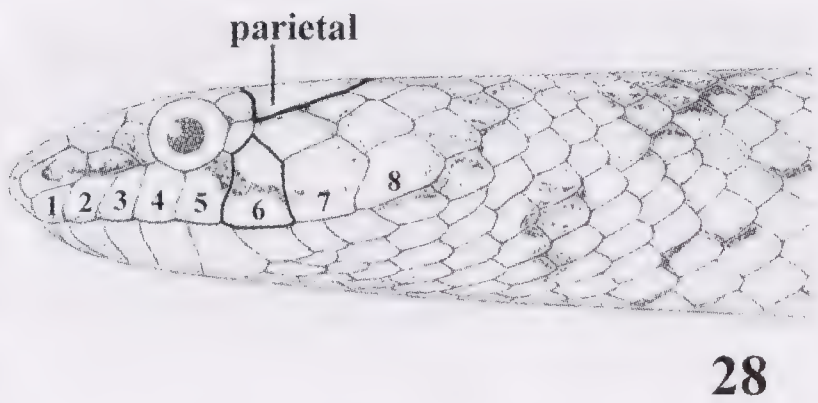
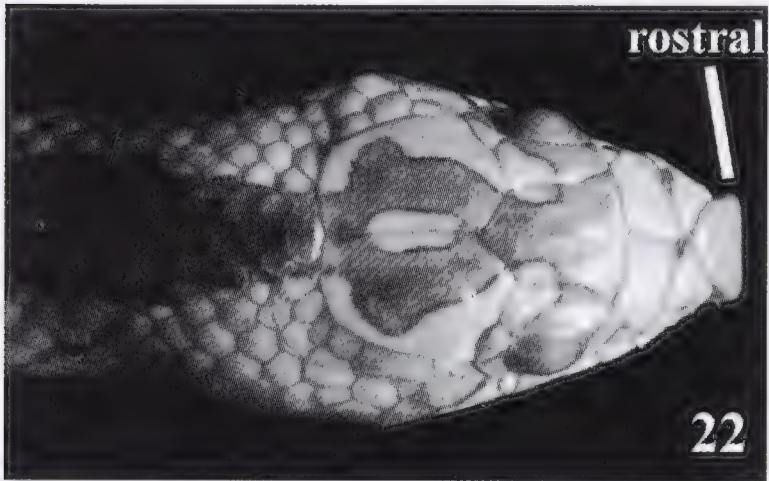
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nostril

eye

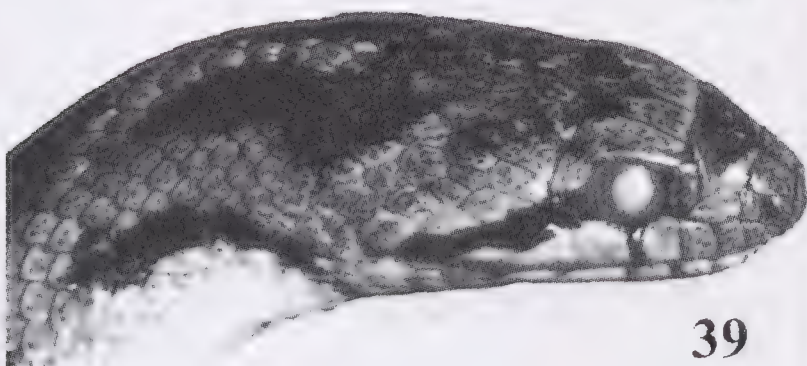
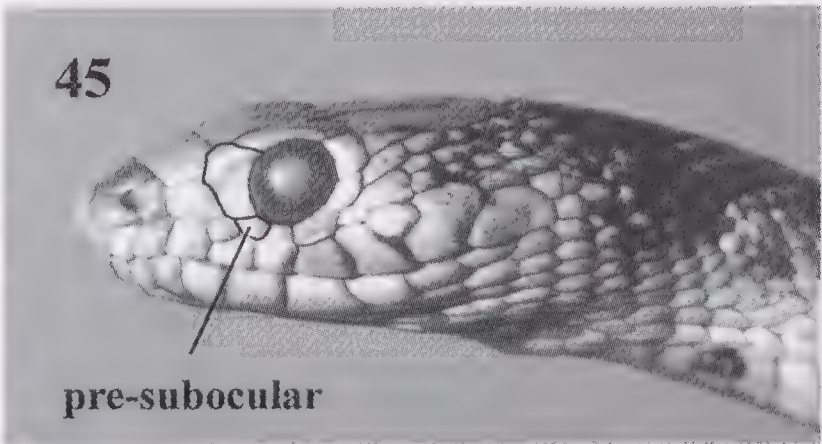
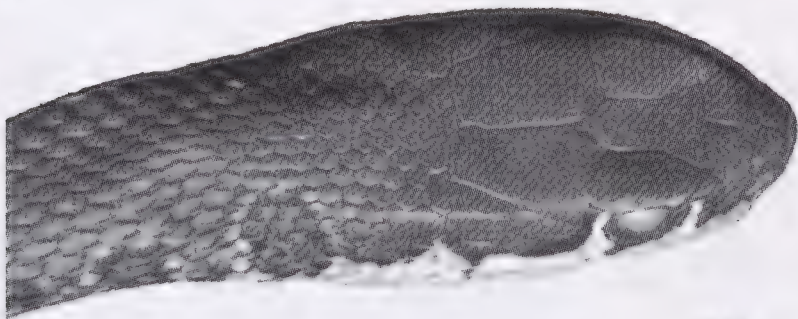
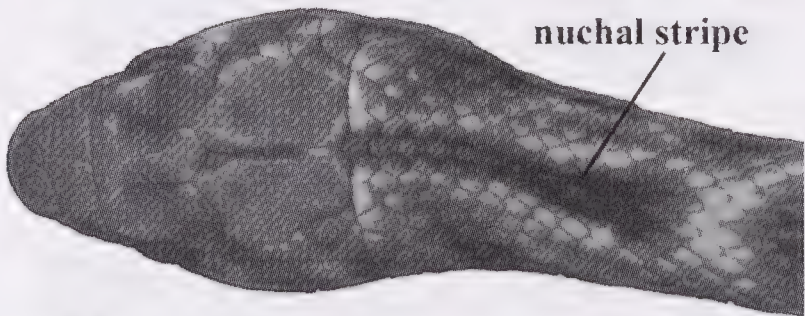
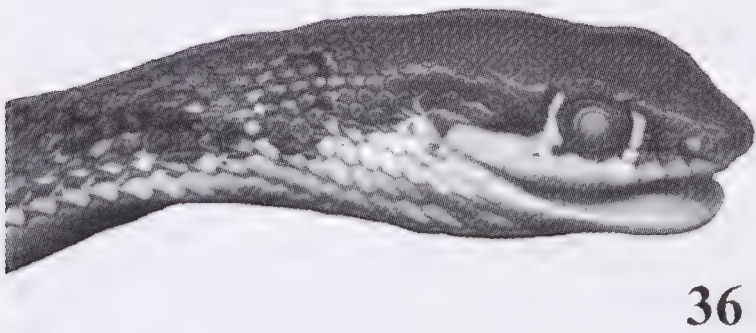
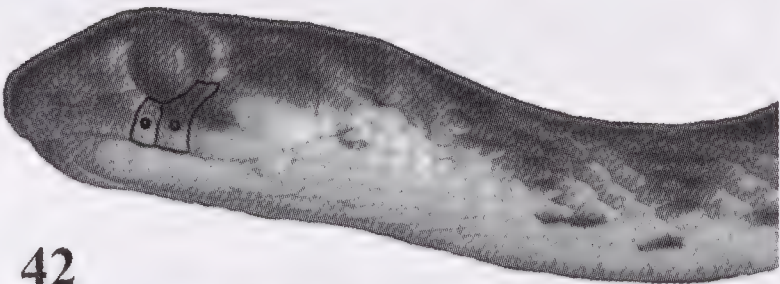
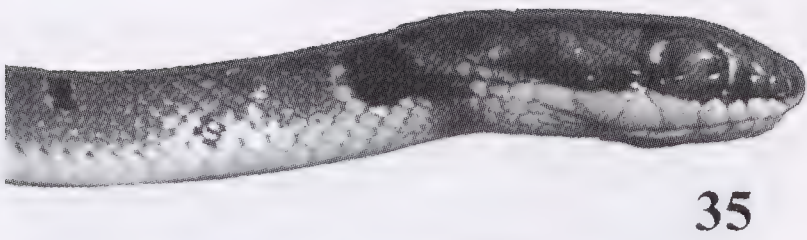
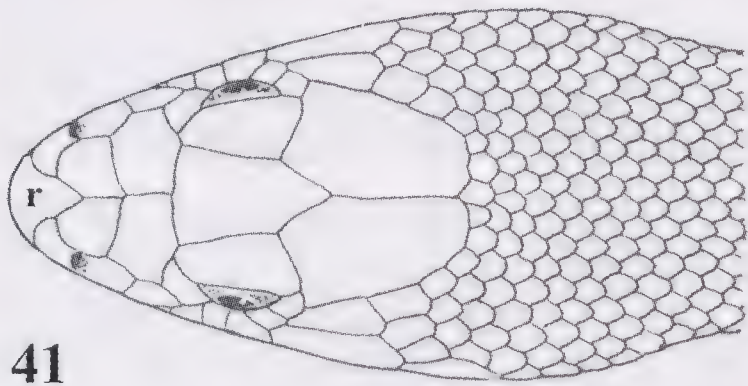
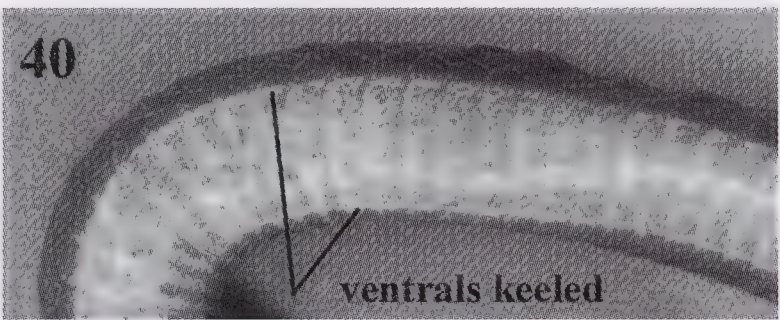
Figs. 22-33

22. *Lytorhynchus*, dorsal view of head evidencing the rostral scale.
23. *Dasypeltis*, lateral view of head (po = preocular, n = nasal scale).
24. *Telescopus*, dorsal view of head.
25. *Lamprophis*, dorsal view of head.
26. *Malpolon monspessulanus*, dorsal view of head (f = frontal scale).
27. *Malpolon moilensis*, dorsal view of head.
28. *Macroprotodon cucullatus*, lateral view of head evidencing the parietal scale almost touching the 6th supralabial.
29. *Psammophis*, dorsal view of head.
30. *Psammophis*, lateral view of head evidencing the poisonous fangs and the loreal scale.
31. *Psammophis sibilans*, lateral view of head evidencing the characteristic pattern.
32. *Rhynchocalamus melanocephalus*, rostral scale large and wedged between the internasals.
33. *Eirenis*, head.



Figs. 34-45

34. *Platycephs elegantissimus*, characteristic body pattern.
35. *Platycephs collaris*, characteristic head pattern.
36. *Platycephs najadum*, characteristic head pattern.
37. *Platycephs collaris*, characteristic forebody pattern from dorsal view.
38. *Platycephs najadum*, characteristic forebody pattern from dorsal view.
39. *Coronella girondica*, characteristic head pattern.
40. *Zamenis persicus*, keeled (angulated) ventral plates.
41. *Rhinechis scalaris*, dorsal view of head (r = rostral scale).
42. *Platycephs rogersi/ventromaculatus*, two supralabials in contact with orbit.
43. *Platycephs rogersi/ventromaculatus*, nuchal stripe.
44. *Platycephs florulentus*, forebody pattern.
45. *Platycephs*, single preocular and presubocular.



Figs. 46-58

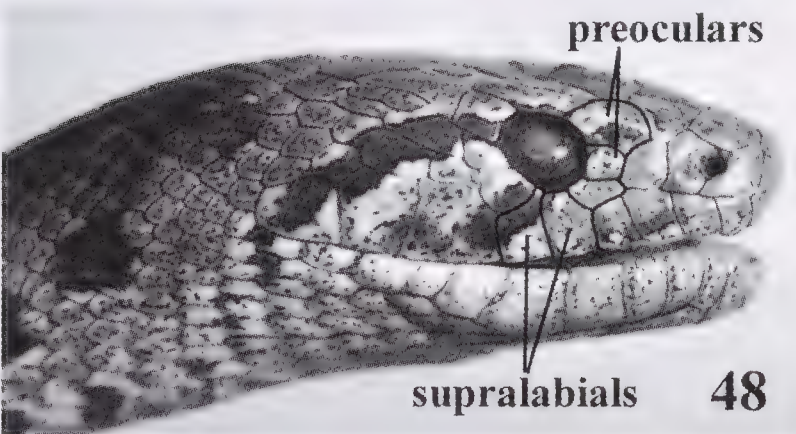
46. *Elaphe dione*, head scalation with postoculars in evidence (p = parietal scale, f = frontal).
47. *Elaphe sauromates*, head scalation (p.o. = postoculars, p = parietal scale, f = frontal).
48. *Hemorrhois ravergeri*, lateral view of head evidencing two preoculars, one pre-subocular and two supralabials entering the eye.
49. *Hemorrhois hippocrepsis*, lateral view of head evidencing the suboculars.
50. *Eirenis persicus*, lateral view of head showing the lack of loreal.
51. *Eirenis coronella*, body pattern.
52. *Eirenis rothi*, head pattern from above.
53. *Eirenis rothi*, head pattern from beneath.
54. *Eirenis collaris*, head pattern.
55. *Eirenis eiselti*, head pattern from beneath.
56. *Eirenis thospitis*, forebody pattern.
57. *Eirenis punctatolineatus*, forebody pattern.
58. *Eirenis lineomaculatus*, forebody pattern.



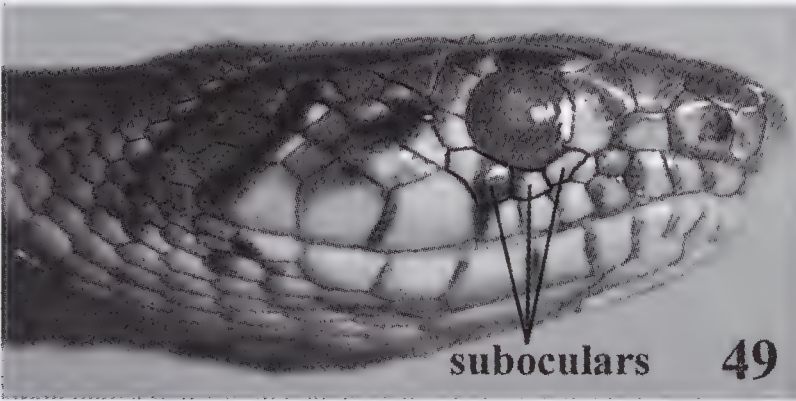
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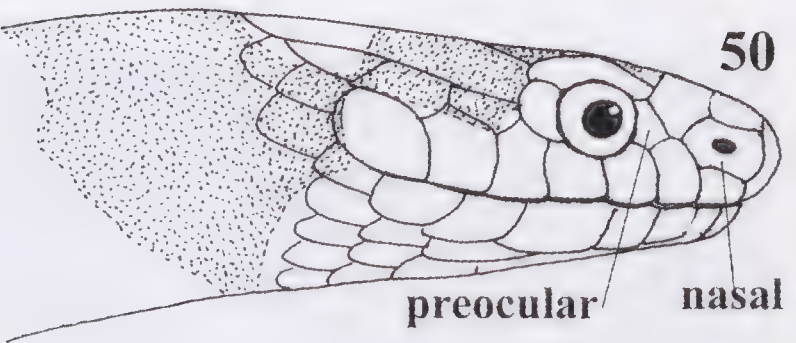
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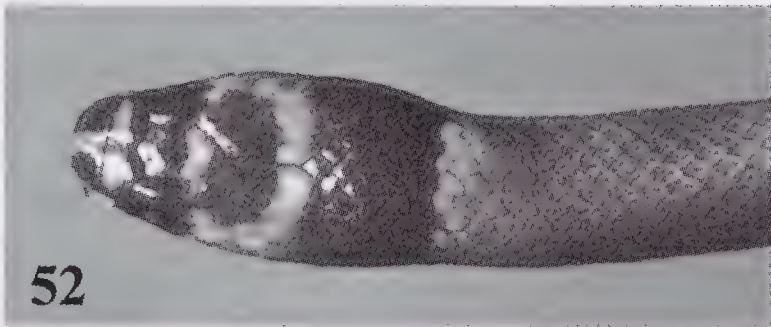
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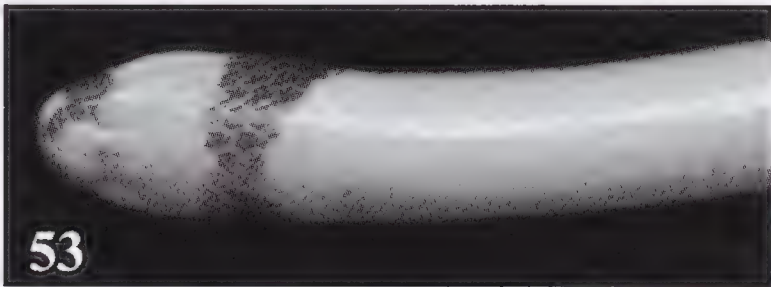
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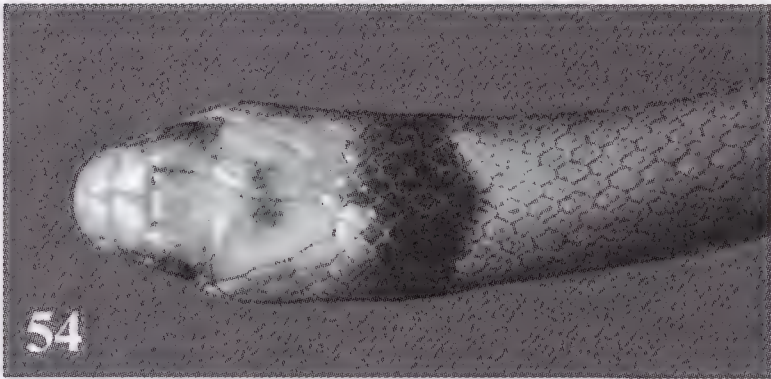
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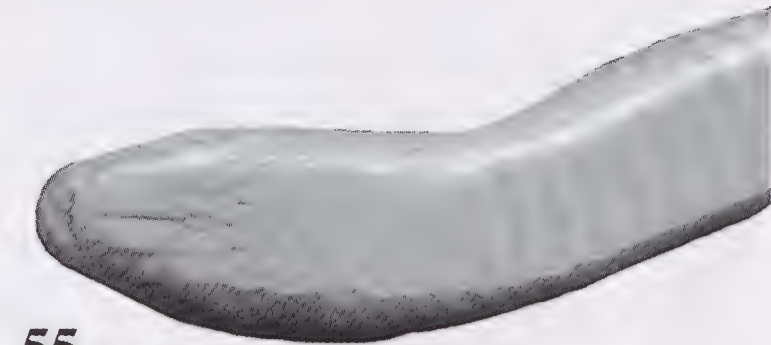
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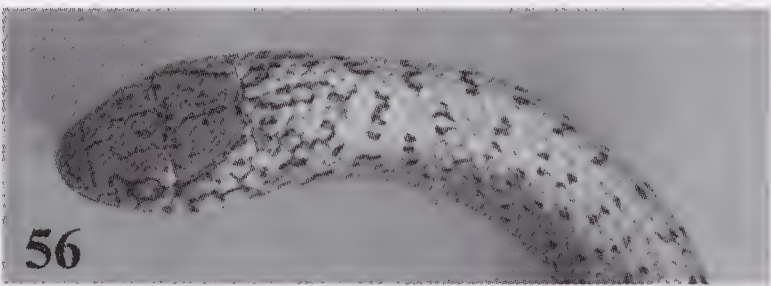
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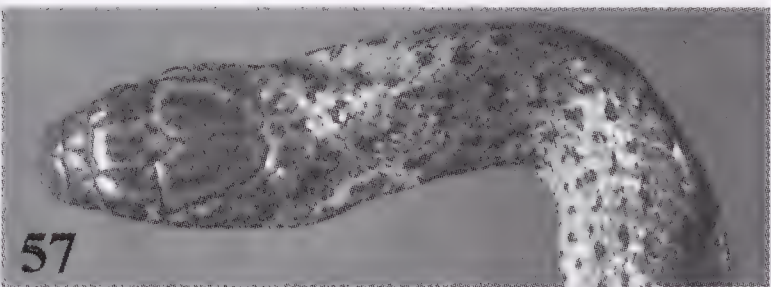
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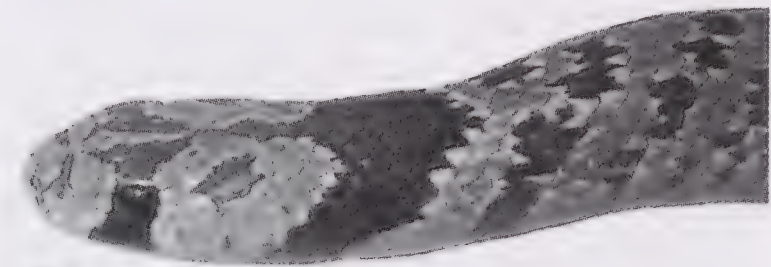
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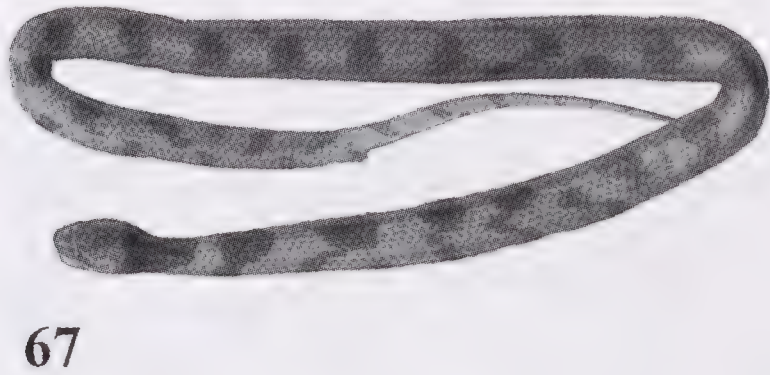
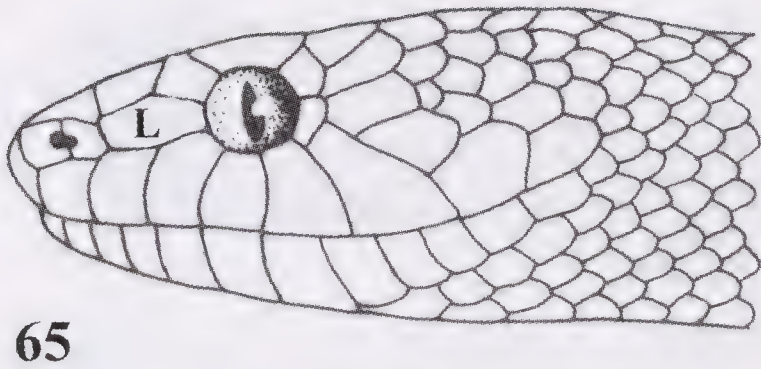
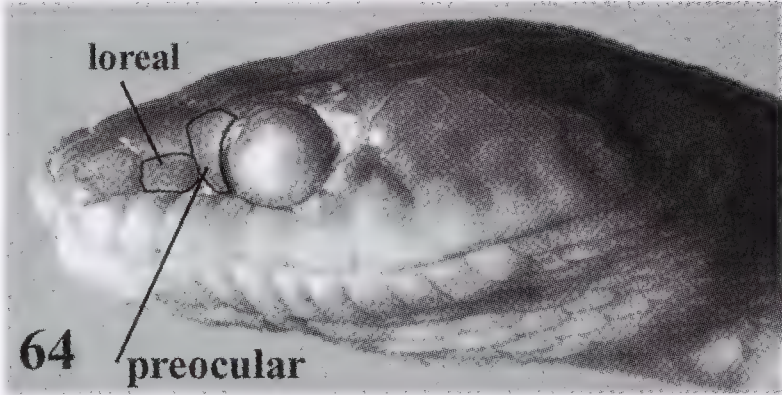
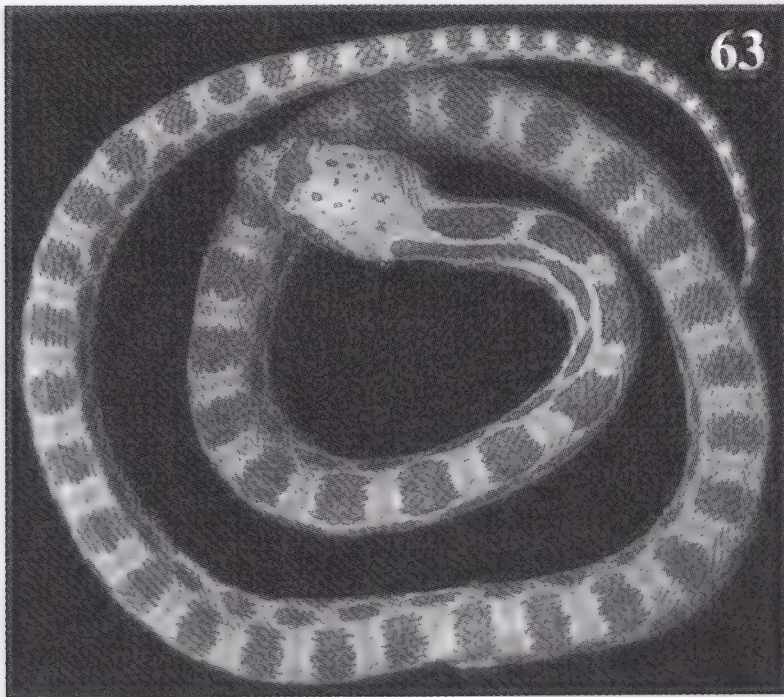
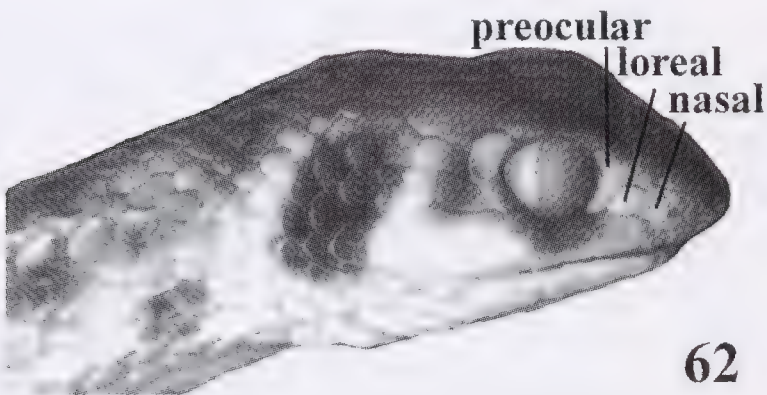
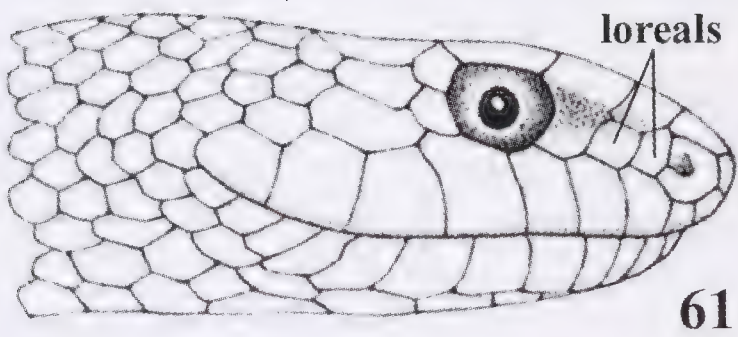
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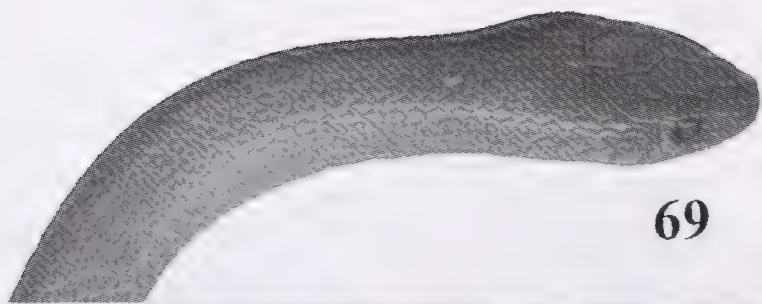
Figs. 59-68

- 59. *Lytorhynchus kennedyi*, body pattern.
- 60. *Lytorhynchus diadema*, body pattern.
- 61. *Malpolon monspessulanus*, lateral view of head.
- 62. *Malpolon moilensis*, lateral view of head.
- 63. *Spalerosophis diadema cliffordi* young, body pattern.
- 64. *Telescopus obtusus*, lateral view of head.
- 65. *Telescopus fallax*, lateral view of head (L = loreal scale).
- 66. *Telescopus nigriceps*, body pattern.
- 67. *Telescopus fallax*, body pattern.
- 68. *Spalerosophis dolichospilus* young, body pattern.

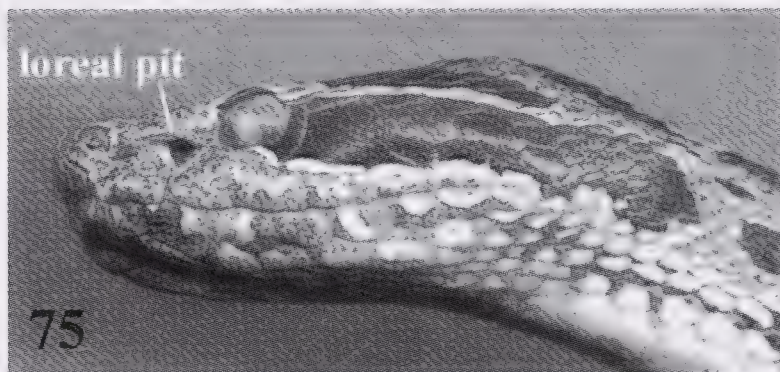


Figs. 69-80

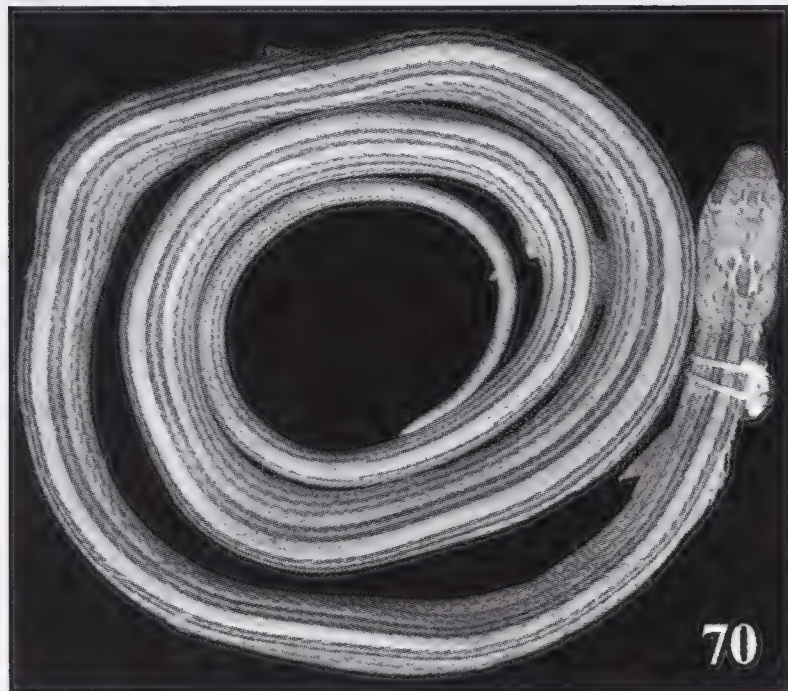
- 69. *Eirenis* cf. *thospitis hakkariensis*, forebody pattern.
- 70. *Eirenis decemlineatus*, striped form.
- 71. *Natrix maura*, lateral view of head.
- 72. *Natrix tessellata*, lateral view of head.
- 73. *Natrix natrix*, lateral view of head.
- 74. *Micrelaps muelleri*, body pattern.
- 75. *Gloydius halys caraganus*, lateral view of head showing the loreal pit.
- 76. *Pseudocerastes persicus fieldi*, lateral view of head.
- 77. *Bitis arietans*, dorsal view of head.
- 78. *Cerastes vipera*, lateral body scales.
- 79. *Cerastes cerastes*, horned form.
- 80. *Macrovipera mauritanica*, dorsal view of head; note the supraocular scale fragmented.



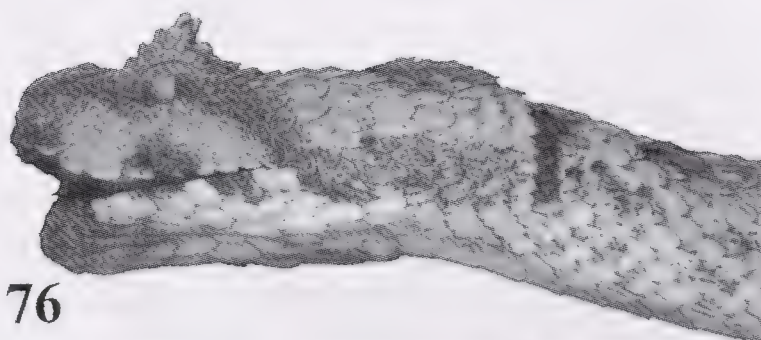
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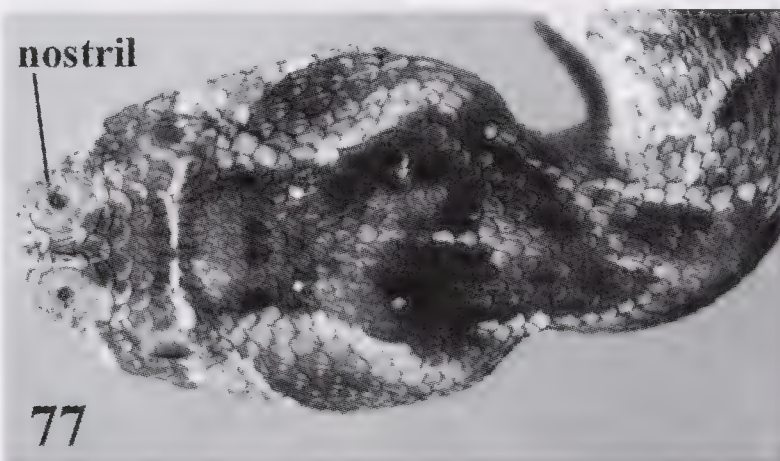
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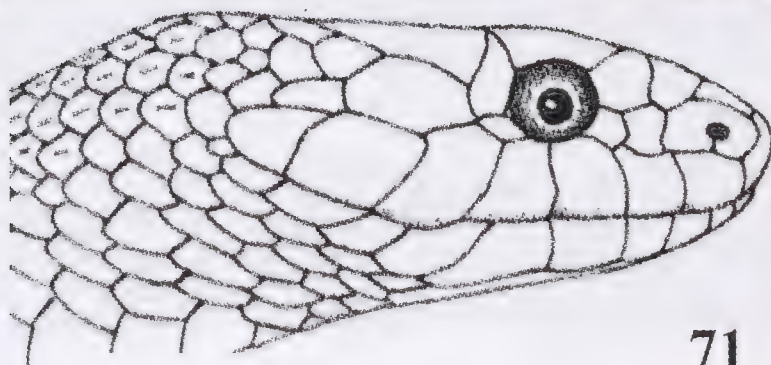
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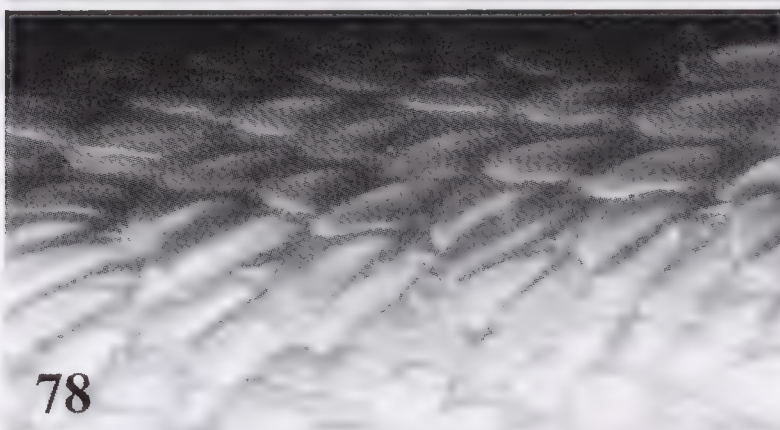
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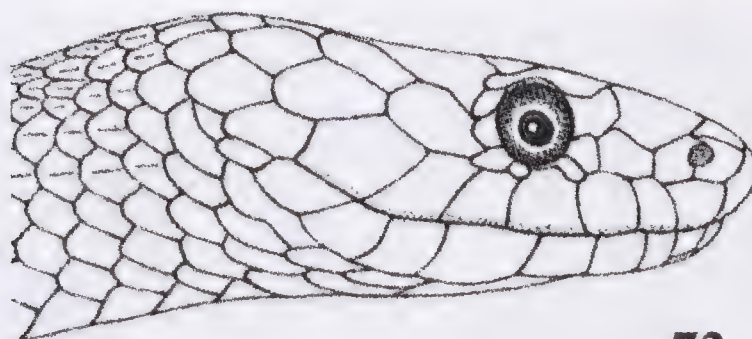
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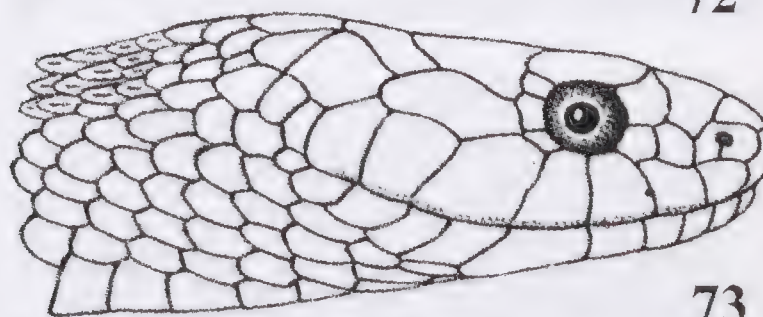
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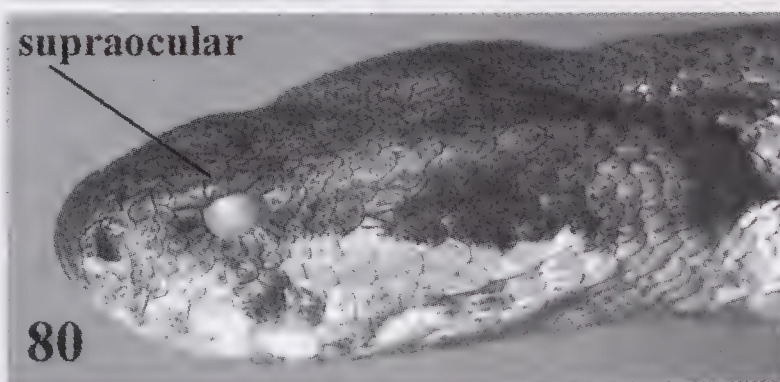
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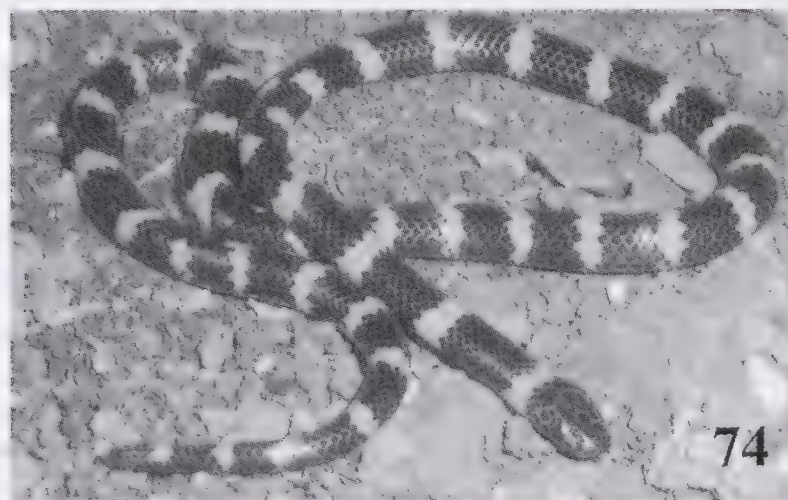
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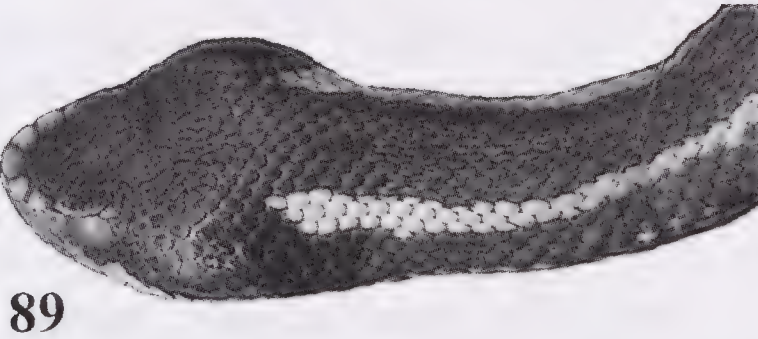
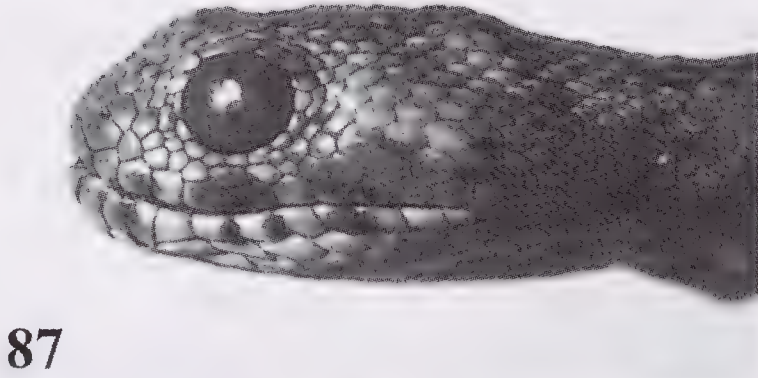
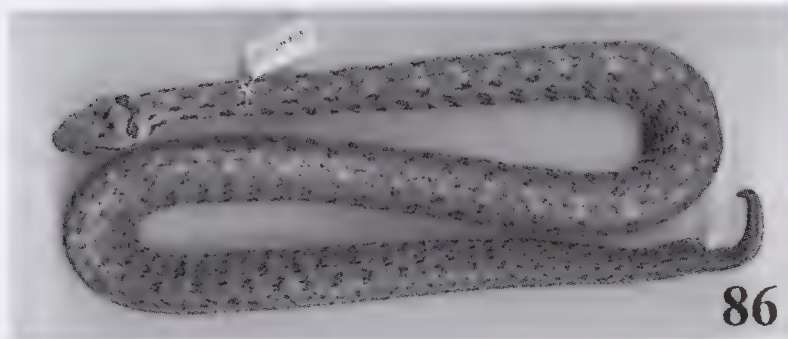
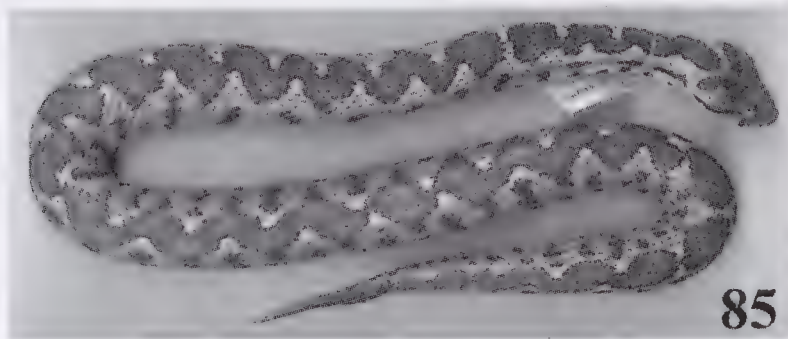
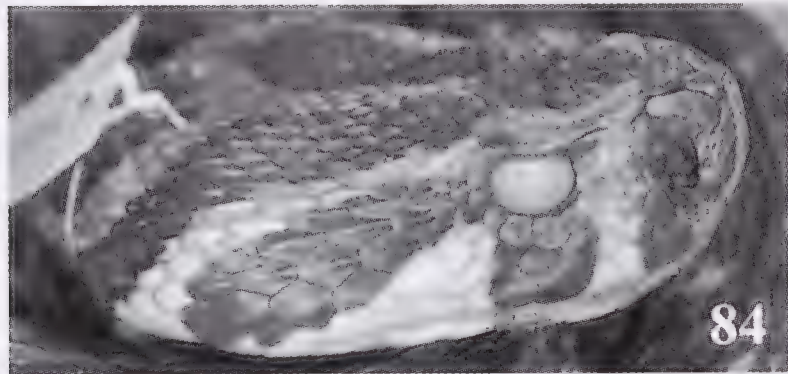
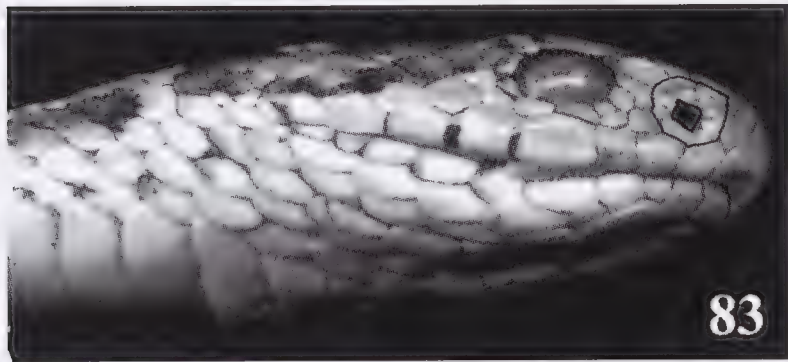
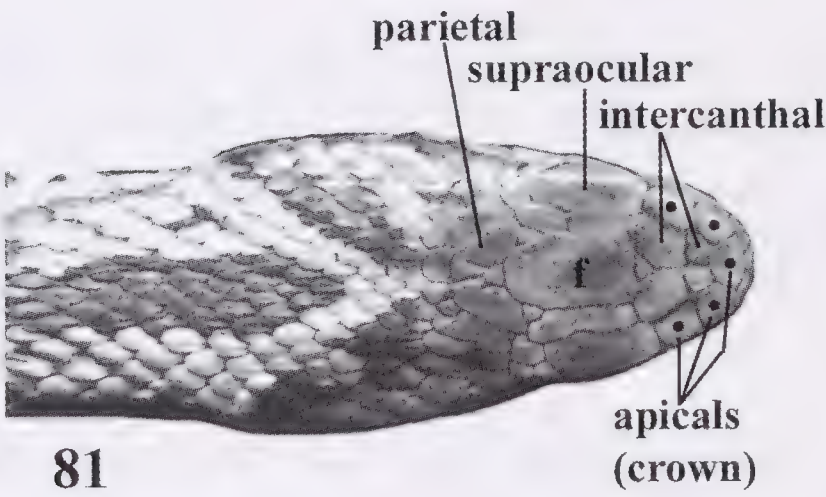
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Figs. 81-90

81. *Vipera (Pelias) ursinii*, dorsal view of head.
82. *Vipera (Montivipera) raddei*, dorsal view of head.
83. *Vipera (Pelias) ursinii*, lateral view of head showing the nostril in the centre of the nasal scale.
84. *Vipera* (s.l.) *palaestinae*, characteristic head pattern.
85. *Vipera (Montivipera) xanthina*, body pattern.
86. *Vipera (Montivipera) raddei*, body pattern.
87. *Echis pyramidum*, lateral view of head.
88. *Echis coloratus*, lateral view of head.
89. *Vipera (Pelias) kaznakovi*, forebody pattern.
90. *Vipera (Montivipera) wagneri*, body pattern.



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ABSTRACT

The authors present an annotated checklist of the species of snakes of the circum-Mediterranean countries.

All the recognised subspecies, the distribution within the study area, the extra-limital distribution and additional remarks are reported. Identification keys of the families, genera and species are provided.

Within the Mediterranean region 110 species belonging to 36 genera and 7 families are present; 48 species occur exclusively in the study area and other 7 are present only in limited adjoining areas; only one is introduced.

RIASSUNTO

Checklist ragionata dei Rettili dei paesi circummediterranei, con tabelle per l'identificazione delle specie. Parte 2. Serpenti (Reptilia: Serpentes)

Gli autori presentano la checklist ragionata delle specie di serpenti dei paesi circummediterranei.

Per ogni specie sono riportate tutte le sottospecie riconosciute, la distribuzione all'interno dell'area di studio, la distribuzione generale, il modello di distribuzione ed eventuali note aggiuntive.

Chiavi di identificazione sono fornite per le famiglie, i generi e le specie; nell'area considerata risultano presenti 110 specie appartenenti a 36 generi e 7 famiglie; 48 sono esclusive della regione mediterranea, altre 7 sono presenti anche in limitate aree limitrofe; solo una specie risulta introdotta.